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THE UNIVERSITY OF ALBERTA

INCOME DISTRIBUTION IN MALAWI

by

AUGUSTINE YELEMIA BOBE (C)

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

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THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled "Income Distribution in Malawi" submitted by Augustine Yelemia Bobe in partial fulfilment of the requirements for the degree of Master of Science.

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Date..1....June...1976.

ABSTRACT

Considerable development has occurred in Malawi since the country became independent in 1964 but little is known about the distribution of income or the benefits of the development. This study is an attempt to provide quantitative income distribution information for Malawi for 1968/69.

After reviewing economic theory relating income distribution to development, the study examines the applicability of welfare economics in the derivation of measures of income distribution disparity. The review reveals that the relationship between income distribution and development is little understood, and the question of income distribution in developing countries such as Malawi has remained relatively undisclosed until recently. Welfare economics, on the other hand, provides insight into the welfare considerations a measure of income distribution inequality should have but stops short of a criteria for the actual quantification of income distribution inequality.

Several summary statistical measures of income inequality have been computed for various estimates of rural cash income distributions in Malawi for 1968/69. The income distributions were estimated from the 1968/69 National Sample Survey of Agriculture data. The various definitions of income, and regional and district income

distributions are compared using the standard deviation of logarithms rankings of inequality. The choice of the standard deviation of logarithms was based on the relative importance of low income groups in the 1968/69 Malawi income distributions and the ability of the measure to ignore proportional additions of income to the income distributions. The general conclusion of the study is that cash income in the rural areas of Malawi in 1968/69 was unequally distributed regardless of the definition of rural cash income used.

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CHAPTER I

INTRODUCTION

Income Distribution and Economic Development

Development economists are increasingly being faced with devising a strategy which will ensure a fairly equitable distribution of the benefits of economic development. Previously economists paid little attention to empirical analysis of the effect of economic development on income distribution. The main goal of economic development was growth of per capita income with the implicit and/or sometimes the explicit assumption that equitable income distribution would follow. However income growth is meaningless when divorced from distributional considerations. Gross national income is the sum of various goods and services indexed by their prices, and prices are partly determined by the distribution of income. Maximization of gross national income or per capita income without considering distributional consequences could therefore lead to a misleading indication of national welfare.

Income distribution considerations received little attention in early works on economic development for a number of reasons. The first and perhaps the single most important reason is due to the hypothesis that income

inequality promotes rapid economic development by increasing the rate of savings and capital formation. While increasing income inequality may stimulate growth in the short-run, it is questionable whether such growth could be sustained because income inequality conflicts with the development of the domestic market needed for sustained growth. Empirical research has yet to show whether income inequality accelerates growth or whether it impedes growth by limiting growth skills and knowledge of the population and killing the domestic demand essential for sustained growth.

Secondly, income distribution policies in economic development have been limited by the absence of knowledge on distributional effects of economic development. National income figures and census data of many developing countries rarely contain the information required for analysis of the income distributional effects of growth. To compound the problem, the evaluation of distributional consequences into comparable terms with other costs and benefits has further led to the disregard of distributional effects in cost-benefit analysis, the technique most widely used in the evaluation of development programs. In order to apply the right policy for economic development it is necessary to know the present level of development as well as the type and degree of inequality of income. A measure of the degree and type of income inequality should therefore be regarded as one of the first steps towards the solution of economic development problems.

Thirdly, some positive economists, who often act as economic development advisors, regard income distribution issues as normative and therefore unfit for objective analysis. Finally, but not least, rural people in most developing countries lack both economic and political power to influence policy makers in development issues. Development programs are concentrated in urban centres and the most favoured geographic regions. More often than not, development programs are designed by high income civil servants without input from the low income people who are to benefit from the programs.

Unless distributional policies are purposely incorporated into development programs, the conventional neglect of income distributional effects of economic development makes one wonder whether economic development does not generate forces which lead to unequal distribution of income or development benefits. It would appear that allocative efficiency considerations alone, would force policy makers to concentrate development efforts in areas with the highest potential returns thereby compounding the income distribution disparity which arises from regional and personal endowments.

This study is an attempt to provide policy makers in Malawi with the necessary distributional information for making development policy decisions. The objectives of the study are:

(a) to measure the 1968/69 distribution of rural income in Malawi, and

(b) to find out if distributional considerations have been effectively incorporated in the siting of development projects as stated in the Statement of Development Policies 1971-1980.[1]

Malawi Development Strategy

Malawi lies some 560 km. (350 miles) west of the Indian Ocean. It is a long narrow country 852 km. (530 miles) in length and 160 km. (100 miles) at its broadest part. It shares boundaries with Mozambique in the east and south, Zambia in the west and Tanzania in the northeast (see Map 1.1).

During the colonial era development was concentrated in the Southern Region since the only rail link with the outside world ran south to Beira on the coast of the Indian Ocean. This tendency was confirmed by siting the first seat of government in the Southern Region. At the time of independence in 1964 only a small proportion of Malawi's natural resources, those located within the Shire Highlands core area (area around Blantyre, Zomba, Thyolo and Mulanje on Map 1.1) and around Lilongwe, had been partially developed. In the Lilongwe area, development mainly consisted of European owned tobacco estates. In the Shire Highlands

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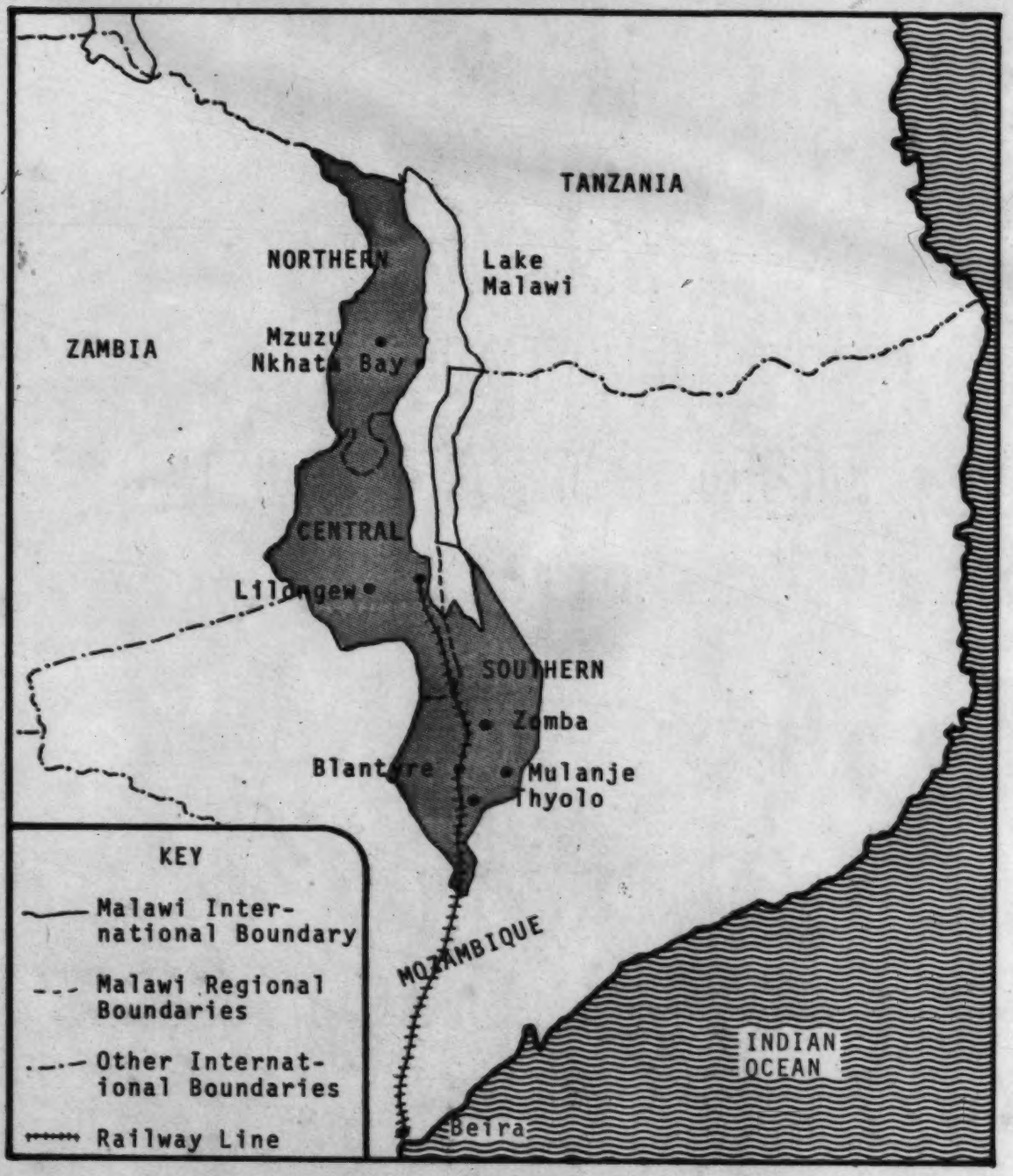
[1] Malawi Government, Economic Planning Division, Statement of Development Policies 1971-1980 (Zomba: Government Press, 1971).

MAP 1.1

MALAWI IN EAST CENTRAL AFRICA



core area, emphasis was placed on the development of manufacturing industries and the expansion of service industries in Blantyre city, vegetable and milk production within a radius of 24 to 32 km. (15 to 20 miles) of Blantyre, and banana and pineapple production in the wetter and warmer areas south of the European owned tea estates in Thyolo and Mulanje. In the Northern and the North Central Regions (north of Lilongwe), development was limited because of the high cost of transportation to and from Blantyre and Beira despite the potential cheap water transport provided by Lake Malawi. Pre-independence development was restricted to the rubber, and later, the tea estates near Nkhata-Bay, and the Colonial Development Corporation's tung estates around Mzuzu. Peasant farmers raised some cattle, but were principally migrant labour for Zambia, Tanzania, Rhodesia, South Africa and the Southern Region.

The effect of such an historical setting resulted in considerable population movements towards the south and a much lower level of development in the Central and, in particular, the Northern Regions. By 1966, 51 percent of the population was living in the Southern Region where population densities were three and a half times as high as in the Northern Region.[1] As a result, most of the areas outside the Southern Region and the Lilongwe core area were deprived of their healthy active male labour force.

---

[1] Ibid., pp. 5-6.

Since independence in 1964, considerable development has been achieved. One important aspect of Malawi's development strategy has been:

> ...to ensure that the fruits of development are spread as evenly as possible throughout all sections of the population and all parts of the country.[1]

A number of measures have been taken to bring about this more even spread of development.

Malawi is predominantly an agricultural country with an economically active population of approximately 1.5 million people, of whom less than 150,000 are in paid employment in Malawi, and about 250,000 who are working in neighbouring countries.[2] This leaves well over one million workers -- and their dependents -- whose only income is derived from small-scale agriculture. The level of real personal income was estimated at K60.00 average GDP per person in 1970, of which only K38.00 was cash income.[3] The rest was non-monetary income. The agricultural production mostly occurs on small farms[4] as reflected in the proportion

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[1] Ibid., p. 5.

[2] Ibid., p. 1.

[3] Malawi Government, National Statistical Office, Malawi Statistical Yearbook 1973 (Zomba: Government Press, 1973), p. 177.

[4] The average holding size per household of small holder farms for the crop season 1968/69 was estimated at 3.8 acres. See: Malawi Government, National Statistical Office, National Sample Survey of Agriculture 1968/69 (Zomba: Government Press, 1970), p. 15.

of national income derived from small holder agricultural activities (Tables 1.1 and 1.2) although estate and government shares of agricultural GDP have been increasing.

The above pattern of economic activities among the population and the nature and distribution of economic resources have dictated Malawi's development strategy which gives top priority to raising agricultural productivity by making maximum use of land and labour, factors in which Malawi is well-endowed, and economizing on the use of the scarce factors, capital and skills. Map 1.2 shows the spread of on-going and planned agricultural development projects which have been planned so as to meet the country's objective of an even spread of the fruits of development.

Beginning in the Northern Region, development projects have been launched or planned as follows (refer to Map 1.2).[1] A development project consisting of the development of crop farming, both dry-land and irrigated, with emphasis on rice production, has been launched in the Karonga Rural Development Project area. The project includes animal husbandry development, road and lake transportation improvements and improvements in health services. The Nkhata Bay Integrated Development Project has been appraised and has resulted in a shift of emphasis to the Karonga Development Project and

---

[1] Information on agricultural development areas has been summarized from A Working Atlas of the Lilongwe Land Development Program (Blantyre: Department of Surveys, 1971), commentary facing Plate 1.

TABLE 1.1

MALAWI GROSS DOMESTIC PRODUCT ACCOUNTED FOR BY AGRICULTURE, 1964-1970

Item	1964	1965	1966	1967	1968	1969	1970	Unit
Agriculture:	84.8	99.2	107.6	110.0	110.0	117.8	124.8	K (million)
	57.3	57.2	55.3	53.8	46.6	50.5	48.4	%
Other Sectors:	63.2	74.3	86.9	94.6	104.4	115.5	133.3	K (million)
	42.7	42.8	44.7	46.2	53.4	49.5	51.6	%
Total GDP at factor cost - current prices:	148.0	173.5	194.5	204.6	214.4	233.3	258.1	K (million)
	100.0	100.0	100.0	100.0	100.0	100.0	100.0	%

Source: Malawi Government, N.S.O., Malawi Statistical Yearbook 1973 (Zomba: Government Press, 1973), Table 20.1, pp. 176-177.

TABLE 1.2

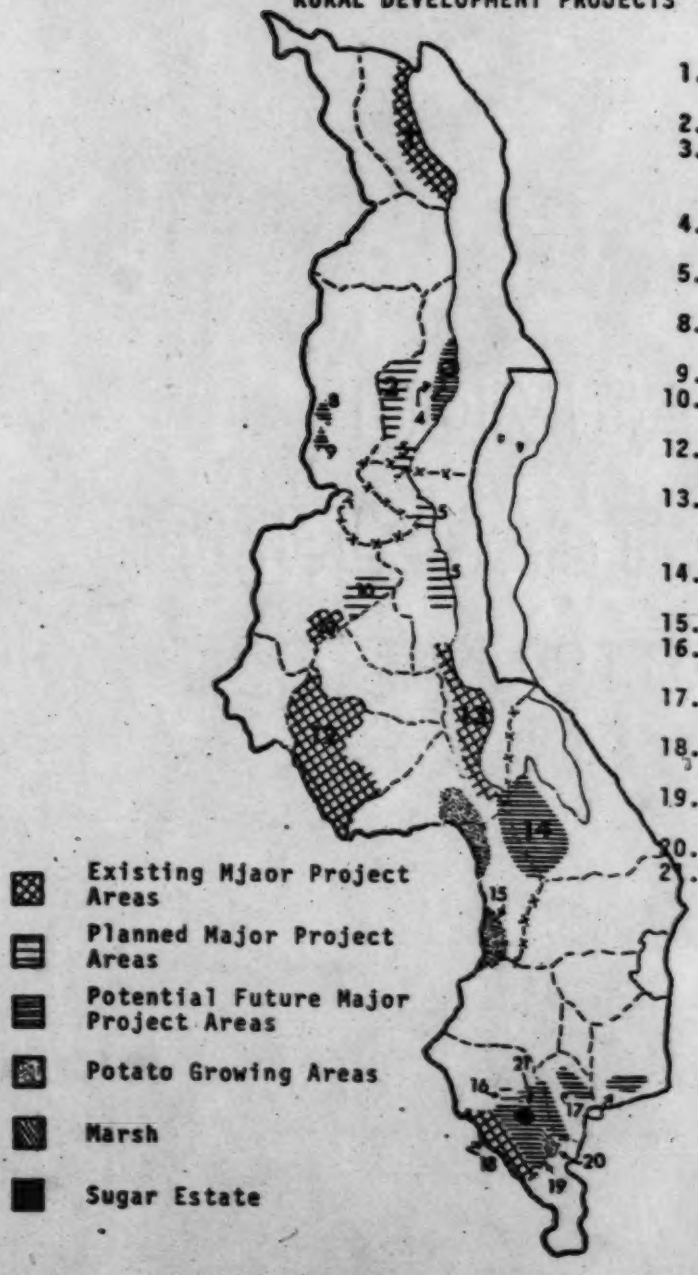
PERCENTAGE OF AGRICULTURAL GDP ACCOUNTED FOR BY SMALL HOLDERS AND ESTATES AND GOVERNMENT, 1964-1970

Item	1964	1965	1966	1967	1968	1969	1970
Small holders:							
Monetary	74.3	71.6	73.1	71.3	71.8	68.5	70.4
Non-monetary	18.8	21.9	20.4	22.1	20.0	22.1	20.4
Sub-total	93.1	93.5	93.5	93.4	91.8	90.6	90.8
Estates and Government	6.9	6.5	6.5	6.6	8.2	9.4	9.2
Total Agricultural GDP (K mn - current prices)	84.8	99.2	107.6	110.0	110.0	117.8	124.8
%	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Malawi Government, N.S.O., Malawi Statistical Yearbook 1973 (Zomba: Government Press, 1973), Table 20.1, p. 176.

MAP 1.2

RURAL DEVELOPMENT PROJECTS


1. Karonga Rural Development Project
2. Vipya Pulpwood Forests
3. Nkhata Bay Integrated Rural Development Project
4. Kawalazi Tea Development Area
5. British Irrigated Rice Project
8. West Mzimba Land Utilization Project
9. Mbawa Ninde
10. Kasungu Flue Cured Tobacco Growers Scheme
12. Lilongwe Land Development Program
13. Central Region Lakeshore Development Project
14. Bwanje Valley Cotton Development Area
15. Gochi/Neno Potato Area
16. Kasinthula Irrigation Project
17. Thyolo/Mulanje Irrigated Tea Areas
18. Lower Shire Valley Development Project
19. Lower Shire Valley Irrigation Project
20. Elephant Marsh
21. Sucoma Sugar Estate
Existing Mjaor Project Areas
Planned Major Project Areas
Potential Future Major Project Areas
Potato Growing Areas
Marsh
Sugar Estate

a strengthening of existing agriculture and natural resources extension work throughout the Northern Region. The Kawalazi Tea Development Area is a small holder tea project. The West Mzimba Land Utilization Project is a pilot project seeking to co-ordinate crop farming and animal husbandry. Mbawa Ninde Project is a small project designed to provide a new source of income in an area where opportunities are limited. (Ninde is a flower from which an essential oil is extracted.) The largest development project in the Northern Region is the Vipya Pulpwood Project which will provide the development of a pulp and board industry at Chinteche.

In the central Region post-independence development emphasis has been on the comprehensive Lilongwe Land Development Program which involves intensive extension efforts, rural credit, conservation works and infrastructure, and land tenure registration, all designed to secure a ten-fold increase in maize production and a doubling of groundnut production. The most imaginative aspect of the attempt to spread development more evenly is the creation of a new capital city at Lilongwe. This development involves the expenditure of approximately K50 million over a period of ten years which will result in the creation of a new economic growth point which is not only in the centre of the country but is also surrounded by areas of high potential agricultural land which is being exploited by the Lilongwe Land Development Program. To the north of Lilongwe the Kasungu Flue-Cured Tobacco Growers Scheme, initiated by the Colonial

Development Corporation, is being expanded in size and scope. In the central lakeshore region, a comprehensive project, the Central Region Lakeshore Development Project, has the principal aim of increasing cotton production and related health and community development. To the north is the British Irrigated Rice Project, a large-scale feasibility study, field trials, and experimental program for a future major project. The Bwanje Valley Cotton Development Area is a possible future development area which will use pumped lake water for irrigation. The Gochi/Neno Potato Area has potential for development.

In the Southern Region, development efforts consist of increasing tea production and acreage by using irrigation during the dry season in the Thyolo/Mulanje tea areas. The lower Shire region (south of Blantyre) has received development efforts in the form of a sugar estate at Nchalo (Sucoma Estate). The Lower Shire Rainfed Cotton Project and the Kasinthula Irrigation Project are also associated with commercial fish-farming. The Lower Shire Valley Irrigation Project, which would include control of the Elephant and Ndindi Marshes, shows potential for the development of an irrigation project.

Outline of the Study.

Chapter II of this study contains a review of general distributional theories with relevance to developing countries

in general and to Malawi in particular and to the problem of measuring income distribution disparity. In lieu of an income distribution theory which can be used for quantifying income distribution inequality, Chapter III outlines some of the common summary measures of income distribution inequality and emphasizes the welfare implications of each measure. Chapter IV gives a description of the survey data used in the derivation of the 1968/69 rural cash income distribution in Malawi. The results of the measurement are presented in Chapter V, and the conclusions and recommendations in Chapter VI.

CHAPTER II

INCOME DISTRIBUTION AND ECONOMIC THEORY

The problem of income distribution has been studied by economists in various fashions for capitalist type economies since the beginning of economics. Classical economists examined the functional nature of income distribution while socialists stressed the conflicts between the rich and the poor. Econometricians have examined the quantitative distribution of national income among individuals and those with a sociological leaning have stressed sociological, economic, geographic and ethnic factors in income distribution studies. However, the problem of income distribution in underdeveloped economies such as Malawi has remained relatively in the dark. This chapter surveys the relationship between economic development and income distribution in order to throw light on the relevance of distributional theories to developing countries such as Malawi and also to determine the derivation of measures of personal income distribution.

General Theories of Income Distribution

The classical theory of distribution as stated by Ricardo has been cited as the attractive classical approach

to developing countries because it deals with economies where industrialization has just started.[1] The Ricardian framework assumes an unlimited supply of labour at the subsistence wage and divides the product into subsistence wage, profits and rent. In the long-run the system reaches a steady position where profits disappear and per capita income remains constant.

The approach is useful as a conceptual framework since it deals with a predominantly agricultural economy with unlimited labour supply, and developing countries such as Malawi have been classified as agricultural with unlimited supplies of labour in economic literature. Other than that, the theory is irrelevant for the problem of measuring personal income distribution since Ricardian distributional theory is more concerned with factor shares than personal income distribution. In addition the theory is irrelevant for many aspects of developing countries. In Malawi, for example, the agricultural production occurs mostly on communal land in contrast to the capitalistic system of landlords; and wages form a relatively small portion of rural incomes. Remittance of money by those working in neighbouring countries and urban centres within the country form a large portion of rural incomes in Malawi and may prove a

---

[1] R. Gendarme, "Reflections on the Approaches to the Problems of Distribution in Underdeveloped Countries," in J. Marchal and B. Ducres, eds., The Distribution of National Income (New York: St. Martin's Press, 1968), p. 362.

favourable factor to personal income equalization and growth. However, Ricardo's approach does not allow for such earnings.

The socialist approach spearheaded by Marx "employs a Ricardian labour theory of value to diagnose exploitation of workers, perpetuated by stagnant wages held down by a surplus army of labour... and a relentless attempt of capitalists to maintain their profit rates in the face of capital accumulation through labour displacing innovations."[1] Marx predicted a collapse of the system in the long-run due to declining wages and the poverty faced by workers while profits accumulate to capitalists. Building on the Marxian exploitation view, Kalecki[2] came up with a monopoly power model which showed that "the greater the prevalence of monopoly conditions, the greater will be the share of monopoly profits in the economy."[3]

The Marxist approach seems applicable to underdeveloped economies in explaining certain values and mechanisms. One can, for example, characterize the exploitation of under-

---

[1] W.R. Cline, "Distribution and Development: A Survey of Literature," Journal of Development Economics, 1 (February, 1975), p. 361.

[2] M. Kalecki, "The Distribution of the National Income," in The American Economic Association, Readings in the Theory of Income Distribution (Homewood: Richard D. Irwin, Inc., 1951), pp. 197-217.

[3] W.R. Cline, "Distribution and Development: A Survey of Literature," p. 364.

developed economies by the colonial governments or the present clash between rich and poor nations using this approach. However, the division of society into workers and capitalists does not seem to apply to underdeveloped situations. In Malawi, for example, the majority of the people in rural areas are self-employed and own land (customary tenure).

The Kalecki approach to Marxian theory of exploitation has explanatory value to underdeveloped economies due to the narrow markets which characterize most of them. In Malawi, for example, the Agricultural Development and Marketing Corporation has monopoly power in the purchase of certain crops from rural areas. There is no reason why the corporation could not pay farmers very low prices and earn very high revenue from the export of the crops. While the division of rural society in Malawi into classes can be rejected it appears that the pauperization of the rural people due to monopoly power is much more difficult to reject.

Another major school of distributional theory centers around human capital models. One approach is Mincer's human capital model[1] which "is based on the idea that occupations requiring longer training periods must necessarily pay higher earnings to compensate for the foregone

---

[1] J. Mincer, "Investment in Human Capital and Personal Income Distribution," Journal of Political Economy, 66 (August, 1958), pp. 281-302.

income during training."[1] The major shortcoming of the model in the context of underdeveloped economies is:

> ...the failure to acknowledge a reverse causation: (a) family background determines level of schooling; (b) given the state of the economy there is certain distribution of high and low paying jobs with remuneration determined by a combination of status and marginal productivity considerations; (c) the education filter screens out a limited number of candidates to be placed in the limited number of high income jobs.[2]

Nevertheless, Mincer's approach explains some of the observed inequalities in incomes between the educated and the uneducated in Malawi. Since education is just one aspect of sociological status in society, one can carry the theory a step further and try to explain income distribution on the basis of social classes, ideological and political factors. The results would very much depend on how clearly one can define social factors so as to bring out the dominating factors which account for the unequal distribution of income.

Theories Relating Distribution and Development

The problem of distribution and growth has been studied from two approaches: (a) the impact of economic

---

[1] W.R. Cline, "Distribution and Development: A Survey of Literature," pp. 365-366.

[2] Ibid., p. 366.

development on income distribution, and (b) the impact of distribution on economic development. The neoclassical approach hypothesized that income distribution would equalize overtime. And several empirical studies appeared to support the hypothesis by indicating that the size distribution of family income is more unequal in underdeveloped than in developed countries.[1] A number of authors have argued, however, that income distribution becomes more unequal with growth, especially in the early stages of development when asset accumulation among the rich is highest and both economic and political power among the poor is minimal.

The orthodox argument to the question of the distributional impacts on economic development led to the hypothesis that income inequality generates growth through savings and capital accumulation. Myrdal[2] has argued that income inequality leads to a decline in growth, contrary to the orthodox hypothesis. His argument, which seems to apply to underdeveloped countries, is that income inequality

---

[1] Simon Kuznets, "Quantitative Aspects of the Economic Growth of Nations: VIII, Distribution of Income by Size," Economic Development and Cultural Change, 11 (January, 1963), T. Morgan, "Distribution of Income in Ceylon, Puerto Rico, the United States, and the United Kingdom," The Economic Journal, 63 (December, 1953) and I.G. Kravis, "International Differences in the Distribution of Income," Review of Economics and Statistics, 42 (November, 1960).

[2] G. Myrdal, Asian Drama: An Inquiry into the Poverty of Nations (New York: Pantheon, 1968).

leads to an unhealthy society, especially among the poor due to lack of purchasing power. Other economists have stressed the potential demand effects of income distribution on economic growth. They have argued that a reduction in income inequality would reduce imports by cutting luxury goods imports and opening economies of scale in the production of the basic goods. It remains a matter of empirical research to assert the direction of the effects of income distribution on growth and vice versa.

In the absence of a consensus on a theory of income distribution and economic development applicable to underdeveloped economies in general and Malawi in particular, it may be possible to postulate particular policies with certain structures that would make income distribution more even. Most of the income distribution theories reviewed above shed some light on certain aspects of the problem of income distribution in underdeveloped economies. In the sections which follow an attempt will be made to isolate a method of choosing alternative ways of bringing about redistribution as well as a method of measuring the present level of income distribution in Malawi.

Income Distribution and Welfare Economics

Utilitarian Welfare Economics

Problems of choice between alternative ways of bringing about a given distribution of income have been studied

in welfare economics for a long time. Under utilitarian welfare economics, social welfare was conceived as the sum total of individual happiness or welfare. And when Bentham[1] wrote that the happiness of society was equivalent to the sum total of the happiness of individuals in the society, he laid down the guiding principle of the right policy, the greatest happiness principle.

The term welfare or happiness implies expression and satisfaction of all the demands of human wants including political stability. Welfare is not always associated with income or the pleasures which income brings. An increase in income may not necessarily result in more welfare or happiness for an individual or the society especially if it is not accompanied by removal or reduction of those factors which tend to reduce happiness such as disease, hunger and ignorance. The application of Bentham's postulate to Malawi means that the individual demands of human wants should form the main criteria for judging individual and social welfare. However, Bentham's principle does not address itself to the problem of measuring individual demands of human wants which form the basis of social welfare.

Following Bentham's principle of the greatest happiness, welfare economics developed along the lines of attempt-

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[1] J. Bentham, Introduction to the Principles of Morals and Legislation (Oxford: Clarendon Press, 1823).

ing to find conditions which would maximize the happiness of society. The first major positive criterion for increase or decrease in social welfare was formulated by Vilfredo Pareto[1] when he defined a position of maximum ophelimité (utility) as one where no further change in production and income distribution could bring about any further benefits to society assuming perfect competition and the absence of externalities. The criterion was developed with the aid of Edgeworth's indifference curves and the notion of tangency of the indifference curves was used to indicate the position of a Pareto optimum (equilibrium in production and exchange).

Suppose there are two crops, maize (M) and cotton (C), both being produced by two individuals, A and B. Given the preferences of the two individuals for maize and cotton, their utility indifference curves can be drawn in an Edgeworth-box diagram (Diagram 2.1). The length of the base equals the total quantity of maize and the height equals the total stock of cotton produced by A and B. Using the south-west corner O_A as the origin, the quantities of maize and cotton produced by A are measured by O_AM_A and O_AC_A, respectively. Using the north-east corner O_B as the origin, the quantities of maize and cotton produced by B are measured by O_BM_B and O_BC_B, respectively. Individual

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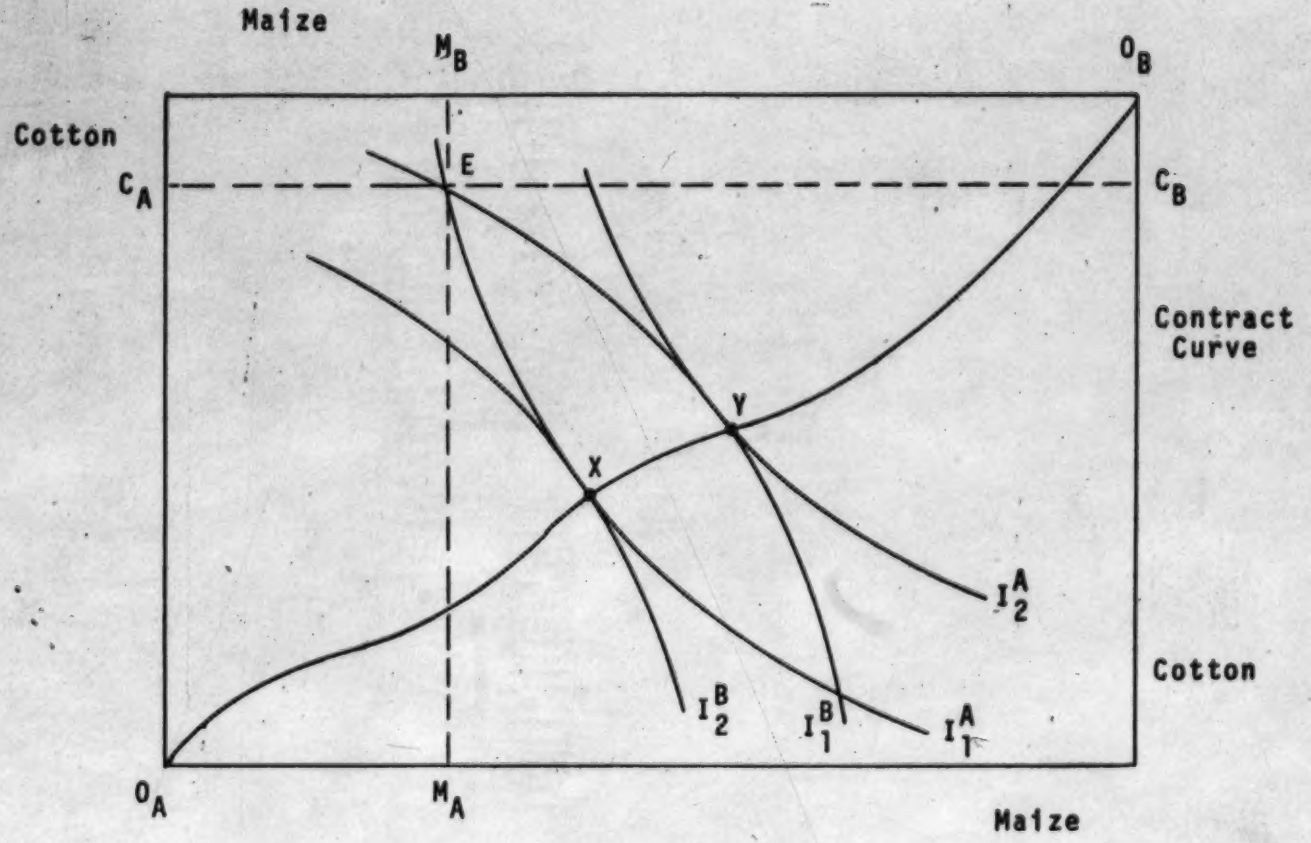
[1] V. Pareto, Manual of Political Economy, translated by Ann S. Schwier, edited by A.S. Schwier and A.N. Page (New York: Augustus M. Kelley, 1971).

DIAGRAM 2.1

AN EDGEWORTH-BOX DIAGRAM SHOWING PARETO OPTIMAL POSITIONS



A's utility curves are drawn using O_A as the origin while B's indifference map is drawn using O_B as the origin.

Starting from the initial allocation of maize and cotton between A and B, represented by point E in Diagram 2.1, it is possible to redistribute maize and cotton through exchange to point Y or point X along either indifference curve I_1^B or I_1^A, respectively, such that at least one of the two individual's utility of maize and cotton increases without incurring losses to the utility of the other. Points Y, X and many other similar points which form a locus of points giving rise to the famous Edgeworth contract-curve O_AO_B (see Diagram 2.1) are regarded as Pareto optimal positions.

The simple illustration of a Pareto optimum above does not offer much insight into the analytical procedure for the problem of measuring individual and social welfare for Malawi. In the first place, the above illustration shows that a Pareto optimum is not a unique general social welfare optimum position. The simple illustration in Diagram 2.1 gives at least two Pareto optimum positions, Y and X, and as pointed out above, there are many more Pareto optimum positions all along the contract curve. Secondly, the assumption of perfect competition associated with the derivation of a Pareto optimal position is hardly attainable in Malawi.

In the third place, the criterion is not helpful in the measurement of individual welfare, which according to

Bentham forms the basis of social welfare. Interpersonal comparisons of welfare are sidestepped by limiting the application of the criterion to cases where some people gain and no one loses and where there are no externalities. For practical purposes there are hardly any economic or social policies in the present complex societies of Malawi which benefit some and harm no one. The scarcity of such policies in the field of economic development is one of the reasons for the attempt to quantify the distributional effects of economic development. Finally, the exclusion of externalities is supported neither by a priori reasoning nor empirical evidence. In more cases than not, individual satisfaction or happiness in Malawi depends on other individual's happiness. The redistribution of maize and cotton from E to either X or Y (Diagram 2.1) can therefore no longer be regarded as necessarily a Pareto optimum because the redistribution would alter the utility derived from maize and cotton by the two individuals. Such a change means altering the shapes of the indifference curves which may result in a Pareto optimum position quite different from X or Y.

The next major development in welfare economics based on utility theory was by Professor Pigou. He took over the Benthamite doctrine of social welfare, but for the first time, economic welfare, defined as that part of social welfare which "can be brought directly or indirectly

into relation with the measuring rod of money,"[1] was distinguished from social welfare. Pigou's main concern was "with the causes of an increase in welfare with a view to indicating the direction in which and the ways by which improvement could come."[2] Although he was less concerned with formulating maximum conditions than Pareto, his treatment of welfare economics was a logical sequel to Pareto optimality as evidenced by the following proposition.

> Any cause which, without the exercise of compulsion or pressure upon people to make them work more than their wishes and interests dictate, increases productive efficiency, and, therewith, the average volume of the national dividend [income], provided that it neither injures the distribution, nor augments the variability of the country's consumable income, will in general increase economic welfare.[3]

Pigou's proposition fitted with Marshall's theory of consumer demand where "it was thought that little could be said about the behaviour of prices if demand was not determined by the behaviour of rational individuals, and a rational man, i.e., the 'economic man', was one who tried

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[1] A.C. Pigou, The Economics of Welfare (4th edition; London: Macmillan and Company, 1932), p. 11, cited by I.M.D. Little, A Critique of Welfare Economics (2nd edition; London: Oxford University Press, 1957, Reprint ed. 1965), p. 9.

[2] M. Dobb, Welfare Economics and the Economics of Socialism (Cambridge: Cambridge University Press, 1969), p. 27.

[3] A.C. Pigou, The Economics of Welfare (London: Macmillan and Company, 1920), p. 47, cited by M. Dobb, Welfare Economics and the Economics of Socialism, p. 28.

to maximize his satisfaction."[1] Both Pigou's proposition and Marshall's theory of demand appear to have been based on the utility theory of consumers' behaviour where the maximization of each individual's utility was a necessary condition of achieving a maximum total utility given a set of production factors.

Pigovian welfare economics introduced another problem to the problem of measuring individual and social welfare. The division of human welfare into economic or material welfare and non-economic welfare is intelligible but not clear cut for both capitalist developed countries and developing countries such as Malawi. "The relative importance which should be attached to economic and non-economic welfare, and the probable effects of changes in economic welfare upon welfare as a whole, have been much disputed"[2] and the dispute is still valid today. Despite the dispute some economists have argued that economic welfare is important for its own sake and as a means for increasing social welfare. Income has therefore been regarded as the means of economic welfare. Using Bentham's principle, one can now say an increase in an individual's income, other things being equal, is likely to increase an individual's happiness and

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[1] I.M.D. Little, A Critique of Welfare Economics, p. 10.

[2] H. Dalton, Some Aspects of the Inequality of Incomes in Modern Communities (2nd edition; New York: Dutton and Co., 1925), p. 9.

social welfare as a whole. From the preceding principle one can argue that personal income inequality in society would imply social welfare inequality for different individuals other things remaining equal. And by applying the law of diminishing marginal utility, "the case against large inequalities of income is that the less urgent needs of the rich are satisfied, while the more urgent needs of the poor are left unsatisifed."[1]

The New Welfare Economics

In an attempt to extend welfare comparisons to situations where some people gain and others lose as a result of policy changes, Kaldor and Hicks came up with the principle of compensation. In its original formulation by Kaldor the principle states:

> In all cases, therefore, where a certain policy leads to an increase in physical productivity, and thus, of aggregate real income, the economist's case for policy is quite unaffected by comparability of individual satisfactions since in all such cases it is possible to make everybody better off than before, or at any rate to make some people better off without making anybody worse off.... In order to establish his case, it is quite sufficient for him to show that even if all those who suffer as a result are fully compensated for their loss, the rest of the community will still be better off than before[1].... This principle, as the reader will

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[1] Ibid., p. 10.

[2] N. Kaldor, "Welfare Propositions of Economics and Interpersonal Comparisons of Utility," The Economic Journal, 49 (September, 1939), p. 550, cited by I.M.D. Little, A Critique of Welfare Economics, p. 88.

> observe, simply amounts to saying that there is no interpersonal comparison of satisfactions involved in judging any policy designed to increase the sum total of wealth just because any such policy could be carried out in a way as to secure unanimous consent.[1]

Kaldor and Hicks did not insist that compensation must actually be paid nor did Barone[2] when he first suggested the notion of a compensating payment in 1908. If the losers are actually compensated by the gainers then we are right back to the Pareto criterion. If payment is made, the principle raises questions involving interpersonal comparisons. For example, one has to determine:

(a) Who is to be compensated;

(b) Who is to compensate;

(c) How much is the loss;

(d) How much is the gain; and

(e) Who is to assess the loss and gain.

If compensation is not paid, the use of potential compensation implies accepting the prevailing distribution of income as a measure of the relative strength of feelings of gainers and losers without actually measuring the prevailing personal income distribution. Following Little, "we do not believe that any definition of an increase in wealth, welfare, efficiency or real social income which

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[1] Ibid.

[2] E. Barone, "The Ministry of Production in the Collectivist State," in Collectivist Economic Planning, F.A. Hayek, ed. (London: Routledge, 1935).

excludes income distribution is acceptable."[1]

The best proposal so far for evaluating welfare is Bergson's[2] social welfare function which includes explicit value judgments about the distribution of income. A social welfare function for Malawi can be thought of as an ordinal index of society's welfare and a function of the utility levels of all individuals. Among the variables to be indexed would be variables like:

> ... the amounts of each of the factors of production, other than labour, employed in the different units, the amounts of the various commodities consumed, the amounts of the different kinds of work done, and the production unit for which this work is performed by each individual in the community during that period of time.[3]

Society's goal is to maximize the social welfare function subject to given constraints on production. Income distribution is accounted for by making value judgments in the social welfare function which depend on the prevailing values of society and the economist making the value judgments.

Despite its elegant formulation and the first sight impression of expressing the society's most desirable dis-

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[1] I.M.D. Little, A Critique of Welfare Economics, p. 92.

[2] A. Bergson, "A Reformulation of Certain Aspects of Welfare Economics," Quarterly Journal of Economics, 52 (February, 1938), pp. 310-334.

[3] Ibid., p. 311, cited by J. Rothenberg, The Measurement of Social Welfare (Englewood Cliffs: Prentice-Hall, Inc., 1961), p. 8.

tribution of welfare, the social welfare function approach has not proved useful in the measurement of personal income distribution nor social welfare. The determination of the shape of a social welfare function which "amounts to determining the relative weights attached to each individual's preferences when these are aggregated into the social preference"[1] has proved very difficult. Arrow[2] has demonstrated that, in general, a social welfare function cannot be constructed such as to fulfill five reasonable requirements[3] without leading to a contradiction.

Conclusion

This review of income distribution and economic theory has brought out a number of important points about the relevance of economic theories of distribution to underdeveloped countries in general and Malawi in particular. Most of the

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[1] T. Scitovsky, Papers on Welfare and Growth (Stanford: Stanford University Press, 1964), p. 185.

[2] K.J. Arrow, Social Choice and Individual Values (2nd edition; New York: Wiley and Sons, Inc., 1963; Reprint ed., 1966), p. 59.

[3] Arrow's five reasonable requirements are: (1) social preferences must satisfy conditions of completeness, reflexivity and transitivity; (2) social preferences should be responsive to individual values; (3) the most preferred state must be in a set of alternatives independent of the existence of other alternatives; (4) social preferences must not be imposed independently of individual preferences; and (5) the social preferences must not totally reflect the preferences of any single individual.

general theories of income distribution explain some but not all aspects of income distribution in underdeveloped economies. The major theoretical flaws arise from the fact that most of the theories were developed for capitalistic economies, not for underdeveloped economies. Nevertheless, the standard economic theory reviewed has established the possible relationships between income distribution and economic growth.

The attempt to isolate a theory for selecting alternative policies for bringing about desired income distributions has established the relationship between individual welfare and personal income distribution on one hand, and social welfare on the other. However, welfare economics stops short of a practical analytical procedure by which personal income distribution or individual welfare can be quantified. "If we assume that welfare distributions affect the social ordering of social states but profess to know nothing about such distributions, then our measures of potential welfare change tell us very little"[1] because:

> ...in a world of more than one commodity, there is no unequivocal meaning to comparing total production in any two social states save in terms of some standard of value which makes the different commodities comparable; and usually such a standard of value must depend on the distribution of income.

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[1] Jerome Rothenberg, The Measurement of Social Welfare (Englewood Cliffs: Prentice-Hall, Inc., 1961), p. 103.

> In other words, there is no meaning to total output independent of distribution.[1]

In the next chapter a number of the common measures of income inequality will be reviewed in an attempt to identify a practical procedure for measuring personal income distribution in Malawi.

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[1] K.J. Arrow, Social Choice and Individual Values, pp. 39-40, cited by J. Rothenberg, The Measurement of Social Welfare, p. 102.

CHAPTER III

MEASURES OF INCOME INEQUALITY

Social Welfare and Inequality Measures

Measuring and comparing income distribution is predicated on a belief in the functional relationship between personal income distribution and social welfare. The previous chapter has established that hypothesis but theory has yet to elaborate on explicit specificiation of the social welfare function relating income distribution to social welfare.

In the absence of welfare criteria which can treat income distribution as an independent variable in the determination of welfare, economists have made use of various statistical measures of inequality when measuring and comparing personal income distribution. The measurement of the level of income inequality has been made possible by applying statistical measures on the size distribution of incomes against some chosen norm of equality, usually perfet equality which reflects a preference for equal distribution. Also implied in all such statistical measures of income inequality are assumptions, which would be made explicit, about the relative weights attached to income at different income size levels.

As early as 1920, Dalton, following the lead of Pigou, suggested that a proper measure of income inequality should be sensitive to any transfer of income from a poorer person to a richer person or vice versa, other things being equal.[1] More recently Atkinson[2] has suggested a second criterion which is concerned with the effect of the overall level of income distribution on the value of the measure of income inequality. According to the criterion, if the income distribution in region A is simply a scaled up version of that in region B, i.e., identical frequency distributions but a higher mean level of income associated with distribution A, then the measure of income inequality should yield the same value for both distributions; that is, the measure should display constant (relative) inequality-aversion, if the level of inequality in the two regions is considered the same. On the other hand, if you argue that distribution A is more unequal (equal) than distribution B, the measure of inequality should yield a higher (lower) value for distribution A than for distribution B or, following Atkinson's terminology, the measure should exhibit increasing (decreasing) inequality-aversion. We shall refer to

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[1] Hugh Dalton, "The Measurement of the Inequality of Incomes," The Economic Journal, 30 (September, 1920), p. 351; A.C. Pigou, Wealth and Welfare (London: Macmillan, 1912), p. 24, cited by A.K. Sen, On Economic Inequality (Oxford: Clarendon Press, 1973), p. 27.

[2] Anthony B. Atkinson, "On the Measurement of Inequality," Journal of Economic Theory, 2 (September, 1970), p. 351.

this criterion as Atkinson's principle of inequality-aversion and together with the Pigou-Dalton principle of transfers, these criteria will be used to evaluate the usefulness of statistical inequality measures reviewed in the following sections. For the specific purpose of measuring personal income distribution in Malawi an ideal measure in terms of the Pigou-Dalton principle should be more sensitive to transfers affecting the lower income groups than the higher income groups because the majority of households in Malawi fall under the lower income classes. In terms of Atkinson's principle of inequality-aversion, an ideal measure should exhibit constant inequality aversion because a proportional increase to all incomes does not necessarily lead to an increase in the social welfare of the people.

Some Common Measures of Inequality

The Lorenz Curve

The Lorenz curve is a graphical presentation of the cumulative percentages of the households arranged from the poorest to the richest on the horizontal axis and the cumulative percentage of total income enjoyed by each group of households on the vertical axis. Zero percent of the households enjoy zero percent of total income while 100 percent of the households enjoy 100 percent of the income. The Lorenz curve therefore runs from position (0,0) to (100,100) on the graph. When each household has exactly the same

income the Lorenz curve is simply a straight line running from position (0,0) to (100,100), signifying perfect equality in the distribution of income between households. When the lower income groups enjoy a proportionally smaller income share compared to their proportion of the total number of households, the Lorenz curve lies below the line of perfect equality, signifying inequality in the distribution of incomes between households (Diagram 3.1).

The Lorenz curve is a useful device for displaying and comparing income distributions of different areas, periods, occupations or even different countries without specifying the social welfare function. Curves closest to the line of perfect equality signify a more equal distribution of income than curves furthest from the line of perfect equality.

When two curves cross neither distribution can be said to be more equal than the other unless the welfare functions describing each Lorenz curve are defined explicitly. The conclusion from the last chapter was that theory has yet to elaborate on the explicit specification of a social welfare function. Only very limited conclusions concerning any two distributions whose Lorenz curves cross can be made. For example, in Diagram 3.2 the level of income inequality is higher in distribution A than B at the lower income levels and vice versa at the higher income levels. On the other hand, definite conclusions about the inequality of income between distributions A and C or B and

DIAGRAM 3.1

A LORENZ CURVE

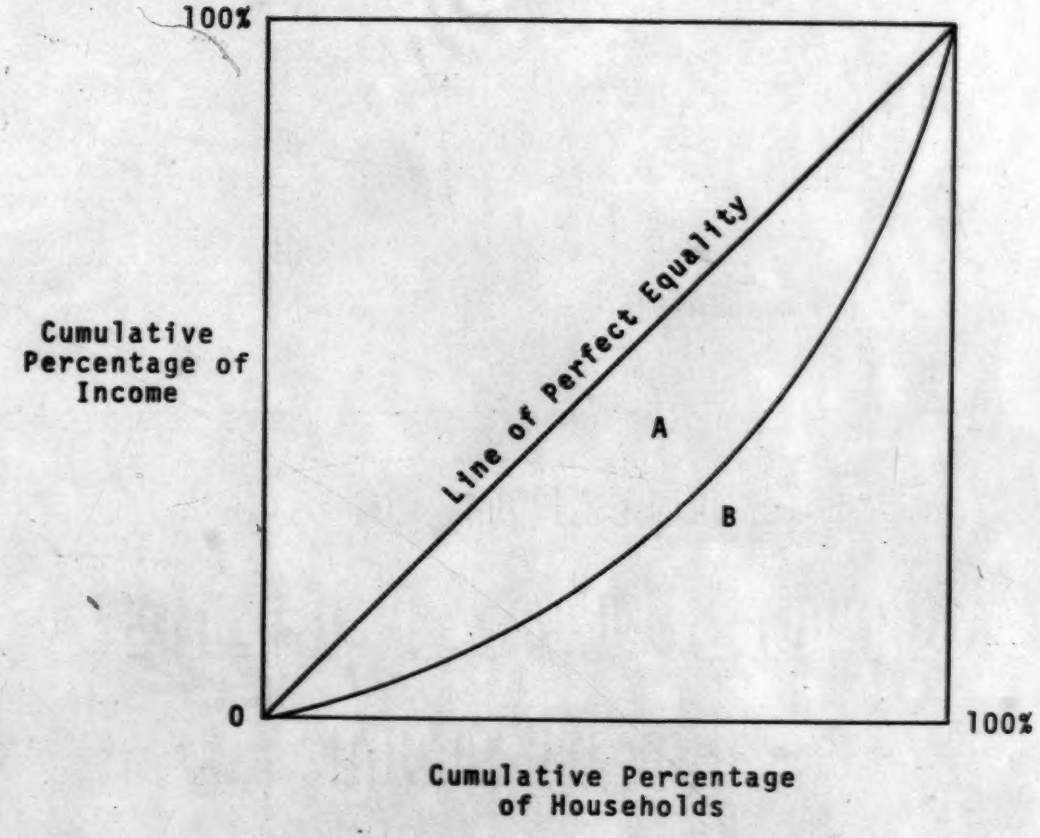
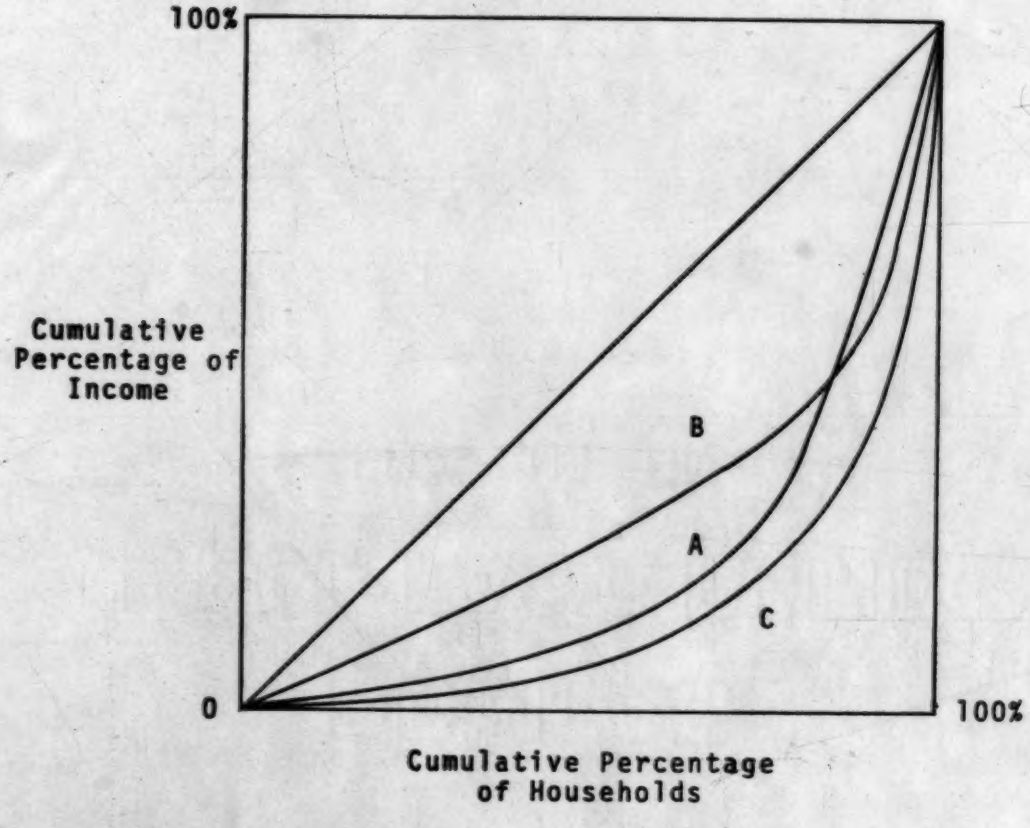


DIAGRAM 3.2

INTERSECTING LORENZ CURVES



C can be reached since neither distribution A nor B crosses with distribution C, subject to the condition that the distributions are ranked independently of the average levels of income. However, Sen[1] has pointed out that one can never be certain that Lorenz curves do not cross, even if they appear not to do so when constructed from group data because group data do not show the distribution within groups.

The Lorenz curve is equally responsive to transfers of incomes between poorer and richer income groups at all income levels. Such a property makes the Lorenz curve unsuitable for the problem of measuring income distribution in Malawi where we would like to attach more weight to income transfers affecting the lower income groups than those affecting higher income groups. On the other hand, the Lorenz curve exhibits constant inequality-aversion; i.e., if distribution A is simply a scaled up version of distribution B, both distributions would yield identical Lorenz curves. The Lorenz curve therefore meets the inequality-aversion requirement for an ideal measure of income distribution in Malawi. However, the problem of comparing such distributions is complicated by the different mean income levels if one wishes to take mean incomes into account. From the welfare point of view the problem can

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[1] A.K. Sen, On Economic Inequality (Oxford: Clarendon Press, 1973), p. 58.

be overcome by attaching welfare weights to the absolute sizes of the incomes so that the comparisons of the Lorenz curves can be made without taking account of the mean income levels.

The Range

The range (E) compares the extreme incomes of distribution. It is defined as the ratio of the gap between the highest income level ($\text{Max}_i\ Y_i$) and the lowest income level ($\text{Min}_i\ Y_i$) to mean income (μ).[1]

$$E = \frac{\text{Max}_i\ Y_i - \text{Min}_i\ Y_i}{\mu}$$

If the distribution of income is absolutely equal, E = 0, and when all the income is received by one person (group), the range is equal to the number of people (groups). The major disadvantage of the range for the problem of measuring

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[1] Ibid., p. 24. For grouped data the range can be defined as:

$$E = \frac{\text{Max}_j \frac{Y_j}{n_j} - \text{Min}_j \frac{Y_j}{n_j}}{\mu}$$

where Y_j is the total income accruing to the j^{th} income group, n_j is the number of households in the j^{th} group and μ is the mean level of income for all individuals.

income distribution in Malawi is that it is not sensitive to the Pigou-Dalton principle of transfers whenever such transfers do not affect the extreme values of the distribution.

The Relative Mean Deviation

The relative mean deviation (M) examines the whole distribution instead of just the extreme values. It is defined as the ratio of the sum of the absolute values of the differences between all incomes and the mean to the total income:[1]

$$M = \frac{\sum_{i=1}^{n} |Y_j - \mu|}{n\mu}$$

where n equals the number of individuals. Perfect equality would yield an M = 0, and with all income going to one per-

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[1] Ibid., p. 25. For grouped data the relative mean deviation can be defined as:

$$M = \frac{\sum_{j=1}^{m} n_j \left|\frac{Y_j}{n_j} - \mu\right|}{N\mu}$$

where the number of groups is m, the number of households in the j^{th} group is n_j, the number of households in all groups is N, the total income accuring to the j^{th} group is Y_j, and the mean level of income for all groups is μ.

son M = 2(n-1)/n. The relative mean deviation is not sensitive to transfers of incomes between people on the same side of the mean income. The measure may therefore fail to meet the criteria of responding to lower income transfers to a greater degree than for higher income transfers.

The Variance

The variance (V) is defined as a ratio of the sum of squared differences between all incomes and the mean to the number of people.[1]

$$V = \frac{\sum_{i=1}^{n} (Y_j - \mu)^2}{n}$$

The variance responds to the Pigou-Dalton principle of transfers. For example, a transfer of incomes from richer people

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[1] Ibid., p. 27. For grouped data the variance is defined as:

$$V = \frac{1}{N} \sum_{j=1}^{m} n_j (Y_j/n_j - \mu)^2$$

where the number of groups is m, the number of households in the j^{th} group is n_j, the number of households in all groups is N, the total income accuring to the j^{th} is Y_j, and the mean level of income for all households is μ. See D.G. Horner, "Income Distribution in Alberta Agriculture" (Unpublished M.A. Thesis, University of Alberta, Edmonton, 1975), p. 52.

to poorer people leads to a decline in the value of V, i.e., indicating a reduction in income distribution inequality. However, the measure does not exhibit the desirable characteristic of weighing transfers at the lower end more heavily than those at higher income levels. With regard to Atkinson's principle of inequality-aversion, the variance exhibits increasing inequality-aversion, i.e., the value of V rises with proportional additions to all incomes which raise the mean income level. Unless one has reason to show that proportional additions to incomes increase inequality, the increasing inequality-aversion characteristic of the variance is not desirable for the problem of measuring income distribution in Malawi.

The Coefficient of Variance

The coefficient of variation (C) is defined as the square root of the variance divided by the mean income.[1]

$$C = \frac{V^{0.5}}{\mu}$$

The coefficient of variation has the advantage of exhibiting constant inequality-aversion because it is defined relative to the mean income. With respect to the Pigou-Dalton prin-

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[1] Ibid., p. 27. For grouped data the coefficient of variation is the square-root of the grouped data variance divided by the mean income per household.

ciple of transfers, the measure responds equally to transfers at all income levels. As in the Lorenz curve, the relative income levels of the people between whom the transfers occur are ignored. The measure does not, therefore, meet the requirement of weighing incomes at the lower levels more heavily than incomes at higher levels.

The Standard Deviation of Logarithms

The standard deviation of logarithms (H) is commonly defined using the arithmetic mean in income distribution literature.[1]

$$H = \left[\frac{\sum_{i=1}^{n} (\log Y_i - \log \mu)^2}{n} \right]^{0.5}$$

It is sensitive to income transfers at all income levels and exhibits constant inequality-aversion; however, it may

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[1] Ibid., p. 29. For grouped data the standard deviation of logarithms is defined as:

$$H = \left[\frac{\sum_{i=1}^{m} n_j (\log \frac{Y_j}{n_j} - \log \mu)^2}{N} \right]^{0.5}$$

where the number of groups is m, the number of households in the j^{th} group is n_j, the number of households in all groups is N, the total income accuring to the j^{th} group is Y_j and the mean level of income per household is μ.

become insensitive to transfers affecting the higher end of the income scale. Despite the insensitivity to transfers at the high income levels, the standard deviation of logarithms displays the desirable characteristics of displaying constant inequality-aversion and weighing incomes at the lower income levels more heavily than those at the higher income levels as is required for the problem of measuring personal income distribution in Malawi.

The Gini Coefficient

The Gini coefficient (G) is the ratio of the area between the line of perfect equality (the diagonal) and the Lorenz curve (area A in Diagram 3.1) to the triangular region underneath the diagonal (A + B). If area B in Diagram 3.1 is approximately by straight lines between plotted points of the Lorenz curve, using grouped percentage data, the Gini coefficient can be estimated by the following formula:[1]

$$G = 1 - \frac{\sum_{j=1}^{m} \frac{1}{2}(R_{j+1} - R_j)(Y_{j+1} - Y_j)}{5000}$$

where R_j is the cumulative percentage of households in the

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[1] D.G. Horner, "Income Distribution in Alberta Agriculture," p. 54 and J. Morgan, "The Anatomy of Income Distribution," Review of Economics and Statistics, 44 (August, 1962), pp. 281-282. See Appendix A of this study for the mathematical derivation of the above formula.

j^{th} lowest income group, Y_j is the cumulative percentage of aggregate income going to the j^{th} lowest income group, m is the number of groups and $R_1 = Y_1 = 0$. "For eight or more groups this approximation should be quite close."[1] The value of G falls between zero and one, zero implying perfect equality and one implying that all the income is received by one household.

The Gini coefficient exhibits constant inequality-aversion and is sensitive to transfers of income but it "attaches more weight to transfers affecting middle income classes."[2] When the above linear approximation formula is used to estimate the Gini coefficient, "the value of a Gini ratio [coefficient] can be seriously biased, and conclusions drawn from ranked Gini ratios can be misleading."[3] The major biases are of two types: "(1) cell bias (both intracell and intercell) and (2) aggregation bias."[4]

Cell bias refers to the over-estimation of area B (Diagram 3.1) due to the linear approximation of the Lorenz curve by straight lines between plotted points which in the

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[1] J. Morgan, "The Anatomy of Income Distribution," p. 281.

[2] A.B. Atkinson, "On the Measurement of Inequality," pp. 256-257.

[3] R.A. Benson, "Gini Ratios: Some Considerations Affecting Their Interpretation," American Journal of Agricultural Economics, 52 (December, 1970), p. 447.

[4] Ibid., p. 444.

end leads to an under-estimation of the Gini ratio. Cell bias would not be a problem if there was a cell (group) for each household; however, it is practically impossible to analyze large populations using such a method. The usual practice is to use stratified data for the calculation of Gini coefficients and it is out of this stratification that cell bias arises. As the number of cells decreases (increases), other things being equal, the value of the Gini coefficient decreases (increases) as shown in Diagram 3.3 where two groups are combined into one. Similarly, "when large proportions of a distribution fall within one cell, the calculated Gini ratios may contain serious downward bias"[1] because a larger percentage of the distribution must be estimated by linear approximation. Cell bias can be eliminated by fitting a continuous function through all the plotted Lorenz curve points and interpolating additional points between the plotted points, and then integrating the function to find the area of inequality or Gini coefficient. However, it is doubtful whether an appropriate type curve can be fitted by least squares passing through all the data points.

Aggregation bias may also arise in the other summary measures of income inequality. It results from the aggregation process of combining heterogeneous regional or district distributions into a completely new distribution for a

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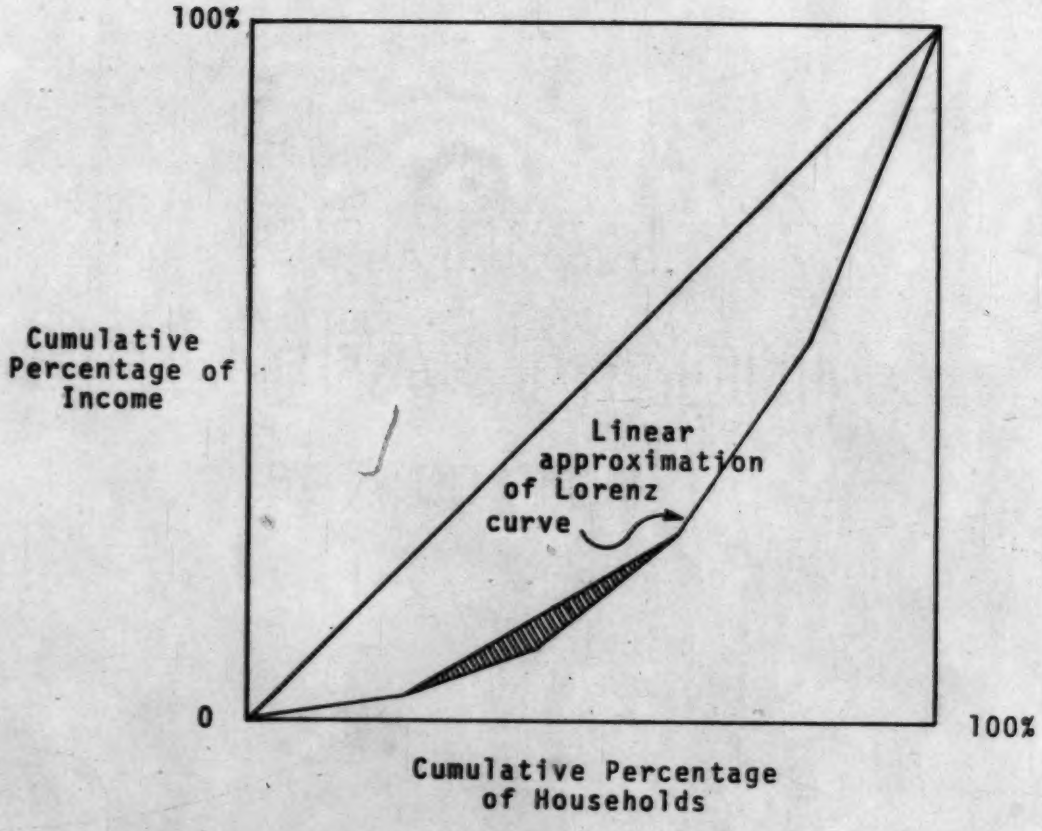
[1] Ibid., p. 446.

DIAGRAM 3.3

GRAPHIC PRESENTATION OF DOWNWARD CELL BIAS OF THE GINI COEFFICIENT



country as a whole such that the aggregate distribution may not resemble the distributions of any region or district included in the aggregation process.[1]

Despite the difficulties encountered in calculating Gini coefficients, the results have a theoretical appeal in that the Gini coefficient depends on the differences of values between themselves and not on the spread about some arbitrary point such as the mean. However, in a more recent study, Paglin warns that the Gini coefficient (and the associated Lorenz curve) may overestimate inequality by as much as 50 percent.[2] The overestimation, as he points out, arises from the 45 degree reference line of perfect equality which overspecifies the conditions of equality when used with annual income data. These conditions require that all households must have perfectly flat age-income, regardless of age and household size. The alternative approach to the socially unrealistic 45 degree line of equality is to generate "new reference lines corresponding to explicit and reasonable definitions of equality, equity, or Pareto optimality"[3] which give a bowed reference line rather than the conventional 45 degree straight line.

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[1] Ibid.

[2] Morton Paglin, "The Measurement and Trend of Inequality: A Basic Revision," The American Economic Review, 65 (September, 1975), p. 601.

[3] Ibid., p. 599.

Summary and Choice of Measures of Inequality

To summarize, "the degree of inequality cannot, in general, be measured without introducing social judgments"[1] because all the measures reviewed so far embody implicit judgments about the weight to be attached to inequality at different income levels. The examination of the seven common measures of inequality have shown that:

(a) The variance implies increasing (relative) inequality-aversion while all the other measures imply constant (relative) inequality-aversion;

(b) The Lorenz curve, the variance and the coefficient of variation attach equal weight to transfers at different income levels;

(c) The range is not sensitive to transfers which do not affect the extreme values of the distribution while the relative mean deviation is not sensitive to transfer on the same side of the mean;

(d) The standard deviation of logarithms weighs transfers at the lower end more heavily and the Gini coefficient attaches more weight to transfers affecting middle income classes.

The range and the relative mean deviation have been

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[1] A.B. Atkinson, The Economics of Inequality (Oxford: Clarendon Press, 1975), p. 47.

termed "more or less, non-starters" by Sen[1] because they fall far too short of the Pigou-Dalton principle of transfers and Atkinson's principle of inequality-aversion. Only the standard deviation of logarithms exhibits the two ideal characteristics for measuring income distribution in Malawi, i.e., weighing transfers affecting lower income groups more heavily than those affecting higher income groups and exhibiting constant inequality-aversion. If the variance, the coefficient of variation, the Gini coefficient and the standard deviation of logarithms could yield the same ranking of income distributions then their combined use could strengthen the measurement and comparison of income distributions and one could rely on the corroboration of several measures as Dalton suggested in 1920.[2] However, it has been shown that all four measures will give the same ranking of income distributions only if the Lorenz curve of the different distributions do not cross, otherwise they may give conflicting results.[3]

For comparison purposes the first step should therefore be to draw the Lorenz curves of the various distributions so as to determine the cases in which the summary

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[1] A.K. Sen, On Economic Inequality, p. 31.

[2] H. Dalton, "The Measurement of Inequality of Incomes," p. 361.

[3] A.B. Atkinson, "On the Measurement of Inequality," p. 253.

measures will agree and in which there is likely to be ambiguity in the ranking of the distributions. The alternative approach, given that the conventional summary measures imply certain distributional values, is to consider such values explicitly. One such approach was suggested by Atkinson in 1970.[1]

Atkinson's measure of inequality introduces distributional objectives through an explicit parameter ε. "This parameter represents the weight attached by society to inequality in distribution."[2] The value of ε ranges from zero, where society ranks distribution solely according to total income, to infinity, where society is concerned only with the position of the lowest income group. More weight is attached to income at the lower income end than at the top end as the value of the parameter ε rises. Atkinson's measure of inequality (I) is defined as follows:[3]

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[1] Ibid., p. 257.

[2] A.B. Atkinson, The Economics of Inequality, p. 48.

[3] A.B. Atkinson, "On the Measurement of Inequality," p. 257 and A.B. Atkinson, The Economics of Inequality, p. 48. The following definition of Atkinson's measure of inequality was used for the calculations in this study:

$$I = 1 - \left[\sum_{j=1}^{m} \frac{n_j}{N} \left(\frac{Y_j}{n_j} \div \mu \right)^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}$$

where the number of groups is m, the number of households in the j^{th} group is n_j, the aggregate number of households in N, the total income accuring to the jth group is Y_j and the average income per household for all households is μ.

$$I = 1 - \left[\sum_{j=1}^{m} \int_j \left(\frac{Y_j}{\mu} \right)^{1-\varepsilon} \right]^{\frac{1}{1-\varepsilon}}$$

where Y_j denotes the income of those in the j^{th} income group (m groups), $\int_j$ denotes the proportion of the households with incomes in the i^{th} group, and μ denotes the mean income.

> The measure has a very natural interpretation as the proportion of the present total income that would be required to achieve the same level of social welfare as at present if incomes were equally distributed: a value of 0.12 means that we could reach the same level of social welfare with only (1.00-0.12) = 88 percent of the present total income. Alternatively, the [potential] gain from redistribution to bring about equality would be equivalent to raising total income by 12 percent.[1]

The measure can therefore be used "to attach some absolute measure to the degree of inequality.[2]

The role of the analyst in this case would be reduced to one of choosing the value of the parameter ε, "which is clearly a measure of the degree of inequality-aversion -- or the relative sensitivity to transfers at different income levels."[3] One can also consider using different values for the parameter ε when dealing with different income gaps between the rich and the poor.

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[1] A.B. Atkinson, The Economics of Inequality, pp. 48-49.

[2] Ibid., p. 45.

[3] A.B. Atkinson, "On the Measure of Inequality," p. 257.

CHAPTER IV

ESTIMATION OF THE 1968/69 DISTRIBUTION OF RURAL INCOME IN MALAWI

The measurement of the distribution of income by any of the measures reviewed in the previous chapter requires income data by economic classes. The data for this study were derived from the National Sample Survey of Agriculture (N.S.S.A.),[1] conducted during the period 1st December, 1968 to 30th November, 1969. This chapter outlines the nature of the 1968/69 N.S.S.A., the method used to estimate the distributions of rural cash incomes and some limitations of the data.

The Nature of the National Sample Survey of Agriculture

The 1968/69 N.S.S.A. was the first large comprehensive survey covering traditional rural areas (land held under customary tenure) of Malawi. The sample survey universe consisted of 91.8 percent of the country's population (Table 4.1).

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[1] Malawi Government, National Statistical Office (N.S.O.), National Sample Survey of Agriculture 1968/69 (Zomba: Government Press, 1970).

TABLE 4.1

POPULATION BY TYPE OF AREA

Type of Area	Total	Percent
Urban Area	203,303	5.0
Trading Centres	18,143	0.4
Estates	75,528	1.9
Missions	19,283	0.5
Government Stations	16,349	0.4
Traditional Rural Areas	3,706,977	91.8
All Malawi	4,039,583	100.0

SOURCE: Malawi Government, N.S.O., Malawi 1966 Population Census, Final Report (Zomba: Government Press, 1968) cited in the National Sample Survey of Agriculture 1968/69, Table A, p. v.

The survey was designed to provide data for the administrative areas (3 regions and 23 districts, Map 4.1) and also for 35 of the country's natural areas selected by the Natural Resources Planning Unit. The objective of the survey was "to obtain information on the acreage of land under principal crops, on the yield per acre of maize and groundnuts, and on household income and expenditure."[1] The data was needed for planning "the development of agriculture in the rural areas" and for updating "the national accounts to show patterns of income and expenditure in the monetary sector of the rural economy covered by the survey."[2]

The 1968/69 N.S.S.A. was preceded by a pilot survey which allowed "testing of procedures before the larger survey and also provided some summary data for two consecutive crop seasons."[3] The pilot survey was conducted between 1st January and 27th October, 1968, and it covered the same universe as the 1968/69 N.S.S.A. but used a smaller sample of 80 enumeration areas (E.A.'s)[4] compared to the N.S.S.A. stratified sample of 410 E.A.'s out of a universe of 4,059 E.A.'s

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[1] Ibid., p. v.

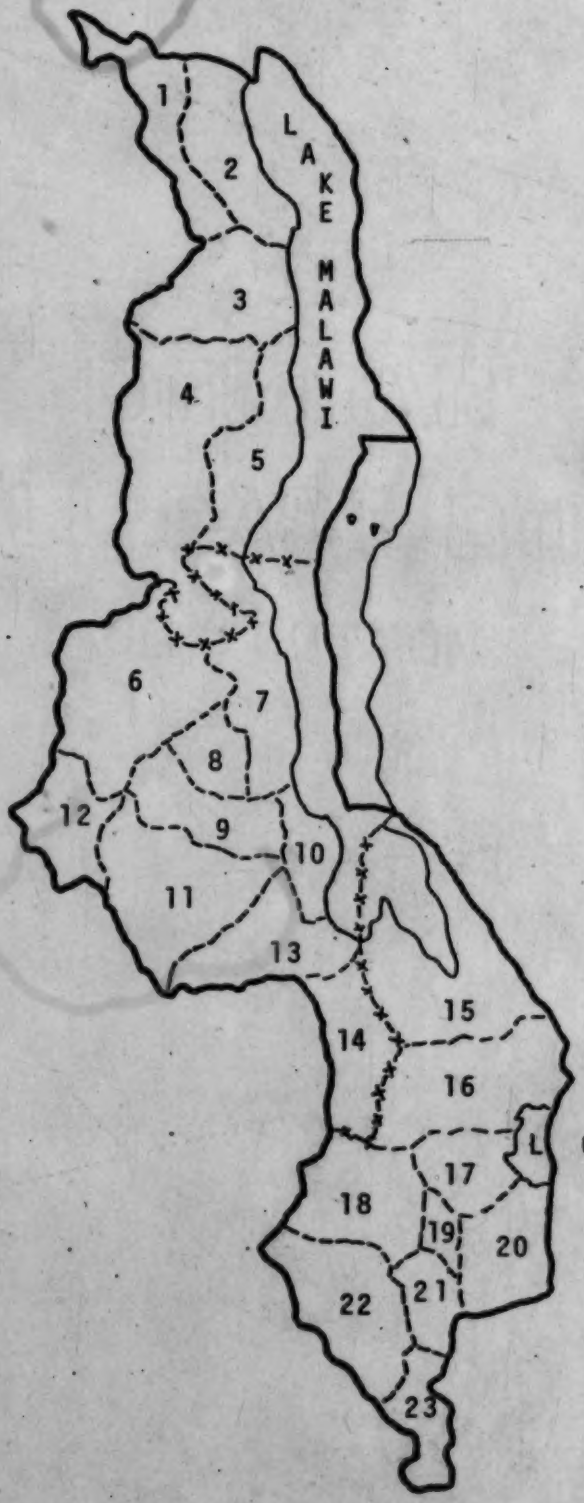
[2] Ibid., p. v.

[3] Ibid., p. iii.

[4] An enumeration area was defined as a small geographical area used in the Malawi 1966 population census as a unit of enumeration.

MAP 4.1

ADMINISTRATIVE AREAS



NORTHERN REGION

1. Chitipa
2. Karonga
3. Rumpi
4. Mzimba
5. Nkhata Bay

CENTRAL REGION

6. Kasungu
7. Nkhota Kota
8. Ntchisi
9. Dowa
10. Salima
11. Lilongwe
12. Mchinji
13. Dedza
14. Ncheu

SOUTHERN REGION

15. Mangochi
16. Kasupe
17. Zomba
18. Blantyre
19. Chiradzulu
20. Mulanje
21. Thyolo
22. Chikwawa
23. Nsanje

The income data used in this study was obtained during a household interview phase of the N.S.S.A. The interviews were conducted during September and November, 1969. The data were obtained by enumerators who interviewed all the sample households for "information for the previous twelve months about farm equipment, farm buildings, livestock, farm expenditures, crop and livestock sales, expenditure on durable consumer goods (including clothing), expenditure on services, and non-farm sources of cash income."[1] The income data are reported in the Malawi pound currency. For the purposes of this study the data have been converted into the new Malawi decimal currency using the conversion rate used when the currency was decimalized in 1971.[2]

Income Definitions

Various definitions of rural cash incomes will be referred to in the study. They are "gross farm cash income", "net farm cash income", "off-farm cash income" and "cash transfers".

Gross Farm Cash Income

Gross farm cash income is defined as cash received

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[1] Malawi Government, N.S.S.A. 1968/69, pp. vii-viii.

[2] Currency unit = Malawi Kwacha (K). Conversion rate: One Malawi pound (£1) = K2.00 = 200 t (tambala).

from the sale of crops, livestock, livestock products and wood products. It is equivalent to the 1968/69 N.S.S.A. definition of current farm cash receipts.

Net Farm Cash Income

In this study net farm cash income is equivalent to the definition of current farm cash income used by the 1968/69 N.S.S.A. It is defined as gross farm cash income minus cash payments made for hand tools, fertilizer, insecticide, labour, seeds and farm transport.

Off-Farm Cash Income

Off-farm cash income is defined as cash other than net farm cash income received from wages, salaries and profits. It is equivalent to the definition of other current cash income used in the 1968/69 N.S.S.A. report.

Cash Transfers

Cash transfers is cash received as gifts from abroad and within Malawi, plus lobola (bride price), plus credit received and still owed at the end of the year plus withdrawals from savings plus the cash sale of capital assets and repayments received for cash loans. This definition is equivalent to other cash receipts used in the 1968/69 N.S.S.A. report.

Estimation of 1968/69 Rural Cash Income Distributions

Estimation of income size distributions was performed in two stages. In the first stage the distributions of households[1] for the districts, the regions and Malawi as a whole were constructed from the respective percentage distributions of households by net farm cash income plus off-farm cash income classes and the total number of households (Table 4.2).

Distribution of Households

The frequency distribution of households presented in Table 4.2 shows that the distribution of households by income class is extremely skewed. Diagram 4.1, constructed from the percentage distributions in Table 4.2, shows a definite pattern in the national and regional frequency distributions. All four distributions are positively skewed with a very weak middle income group peaking at the K50.01 - K120.00 income level. The Southern Region has the largest proportion of households in the middle income range.

Sampled areas in the four largest project areas (Karonga Rural Development Project, Lilongwe Land Develop-

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[1] A household for the 1968/69 N.S.S.A. was defined as a group of people who usually take all their food from a common pot, i.e., a group of people who eat together. The estimated average household size for 1968/69 for the traditional rural areas of Malawi was 4.6. See Malawi Government, National Sample Survey of Agriculture 1968/69, p. xxi.

TABLE 4.2

PERCENTAGE OF HOUSEHOLDS BY NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME GROUPS

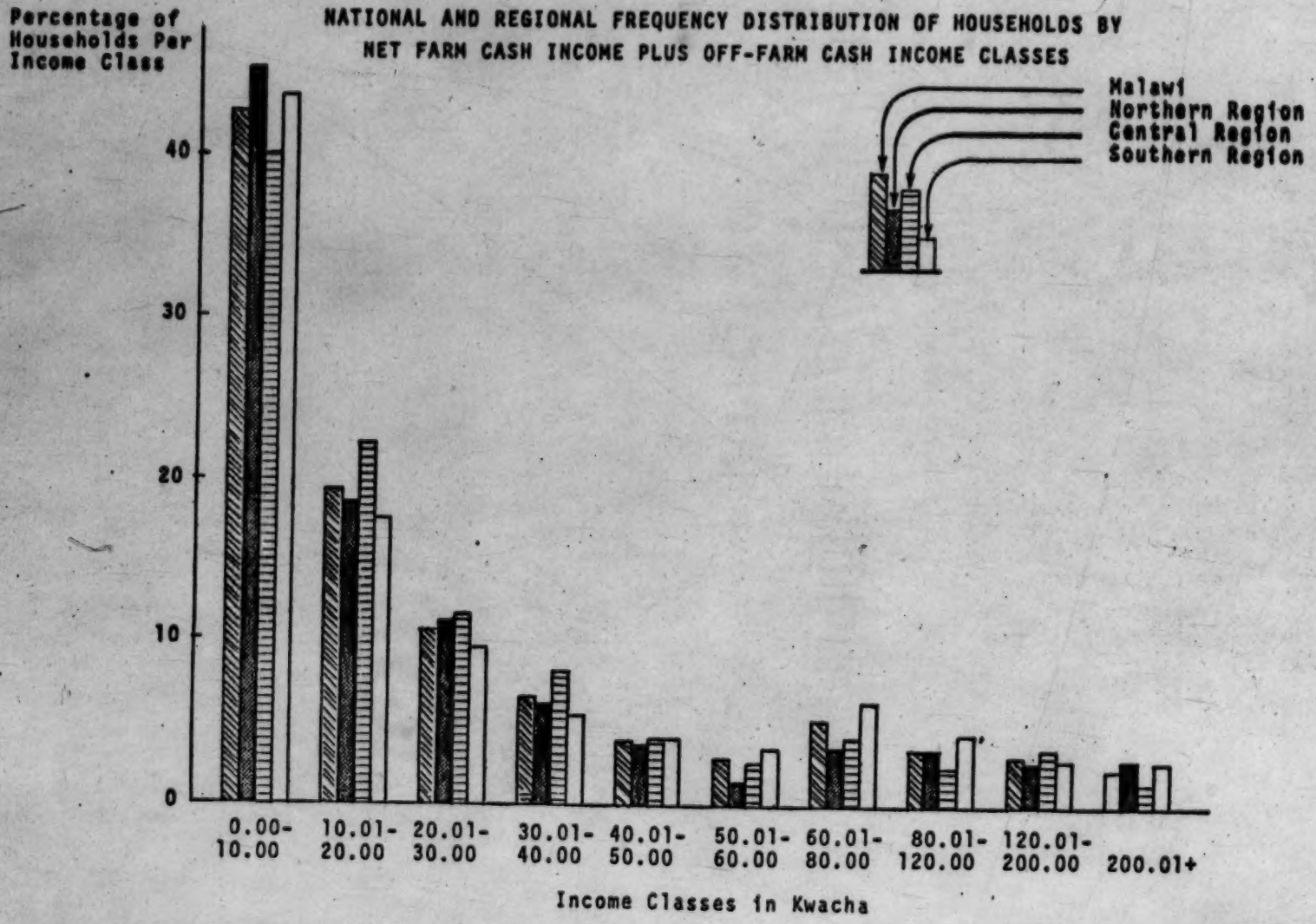
Regional District	Recorded Net Farm Cash Income Plus Off-Farm Cash Income (Kwacha)										Total	
	0.00-[a] 10.00	10.01- 20.00	20.01- 30.00	30.01- 40.00	40.01- 50.00	50.01- 60.00	60.01- 80.00	80.01- 120.00	120.01- 200.00	200.01+	%	No. ('000)
Chitipa	41.9	19.8	10.7	6.0	4.2	3.0	3.6	6.0	2.1	2.7	100.00	14.4
Karonga	21.5	20.0	15.7	11.3	5.8	2.8	7.1	5.8	6.1	3.8	100.00	16.8
Nkhata Bay	59.5	6.8	8.1	6.8	4.0	1.4	0	4.0	1.4	8.1	100.00	24.0
Rumpi	43.2	16.5	10.9	6.4	6.4	1.9	4.6	3.9	3.9	2.3	100.00	9.3
Mzimba	47.5	23.2	11.4	5.7	2.6	0.8	4.1	1.8	2.4	0.5	100.00	52.6
NORTHERN REGION	45.2	18.4	11.2	6.8	3.9	1.5	3.6	3.5	2.8	2.9	100.00	117.1
Kasungu	40.7	28.3	8.7	7.5	5.3	3.7	3.6	1.5	0.7	0	100.00	25.5
Nkhota Kota	46.3	13.9	17.0	7.0	5.2	5.4	2.1	1.4	1.1	0.5	100.00	14.4
Ntchisi	48.4	18.4	9.9	6.6	3.3	2.6	4.2	3.0	2,8	0.9	100.00	15.9
Dowa	29.0	22.0	13.0	9.7	4.9	3.5	6.0	7.0	2.9	2.1	100.00	40.7
Salima	48.9	15.9	11.8	8.8	4.1	2.3	4.5	0.7	2.8	0.2	100.00	18.0
Lilongwe	29.6	25.9	15.1	12.7	4.0	1.7	4.4	1.3	5.9	1.4	100.00	93.2
Mchinji	35.6	16.7	7.7	6.3	6.2	5.7	4.5	5.9	7.6	4.0	100.00	17.4
Dedza	50.5	25.4	10.2	3.0	2.6	1.7	3.0	0.8	2.1	0.6	100.00	54.0
Ncheu	53.8	19.1	6.4	4.4	3.7	2.3	4.5	1.2	2.0	2.6	100.00	37.8
CENTRAL REGION	40.0	22.1	11.7	8.1	4.1	2.6	4.2	2.3	3.5	1.4	100.00	316.9
Mangoche	61.4	13.0	7.3	5.6	4.6	1.6	2.0	4.2	0.3	0	100.00	52.3
Kasupe	42.6	22.5	15.4	2.5	2.8	3.0	5.2	1.5	1.2	3.3	100.00	53.5
Zomba	49.7	15.8	6.8	8.1	2.1	2.6	6.1	4.0	1.5	3.3	100.00	50.1
Chiradzulu	36.2	17.3	8.6	9.2	12.1	1.9	5.6	2.5	4.3	2.3	100.00	33.6
Blantyre	30.9	21.4	10.5	3.6	6.1	3.1	8.1	4.5	5.0	7.0	100.00	44.9
Thyolo	43.1	17.4	8.8	4.0	4.8	3.7	4.8	5.5	5.8	2.0	100.00	55.6
Mulanje	45.7	15.5	7.6	5.3	1.4	5.6	9.7	6.0	1.8	1.4	100.00	102.8
Chikwawa	29.2	22.1	12.4	6.8	4.6	5.3	3.3	5.5	5.7	5.2	100.00	33.3
Nsanje	43.5	16.0	13.4	5.4	3.9	1.6	7.3	2.6	2.6	3.9	100.00	24.9
SOUTHERN REGION	43.7	17.5	9.6	5.4	4.1	3.5	6.2	4.4	2.9	2.8	100.00	451.0
ALL MALAWI	42.6	19.3	10.6	6.6	4.0	2.9	5.2	3.5	3.1	2.3	100.00	885.0

[a] The K0.00-K10.00 group is a combination of the lowest two groups of the original data.

SOURCE: Malawi Government, National Sample Survey of Agriculture 1968/69, Table D6.10, p. 105.

DIAGRAM 4.1

NATIONAL AND REGIONAL FREQUENCY DISTRIBUTION OF HOUSEHOLDS BY NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME CLASSES



ment Program, Central Region Lakeshore Development Project - Salima, and the Lower Shire Cotton Development Project - Chikwawa) show that these project areas, with the exception of Salima, had fewer households in the lowest income group (Diagram 4.2) than the regional frequency distributions of households (Diagram 4.1). Lilongwe Land Development Program, the biggest single rural development program in Malawi, had the smallest proportion of households in the lowest income group (17.8 percent) as well as the biggest proportion of households in the income range K20.01 - K60.00 (Diagram 4.2).

Distribution of Income Per Household

The second stage of the estimation of income size distributions involved computation of the income size distributions using the household distributions worked out in stage one and the average cash incomes per household by net farm cash income plus off-farm cash income classes (Table 4.3). Distribution of cash incomes for districts and natural areas were computed using the regional cash incomes per household because similar data on district and natural area levels were not available. All the distributions are based on the distribution of households according to net farm cash income plus off-farm cash income classes.

The highest average gross farm cash income per household and the highest net farm cash income per household was in the Southern Region at K17.08 and K14.36, respectively. The Central Region had the highest average net farm cash

DIAGRAM 4.2

PERCENTAGE DISTRIBUTION OF HOUSEHOLDS BY NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME CLASSES IN THE FOUR MAJOR RURAL DEVELOPMENT PROJECT AREAS

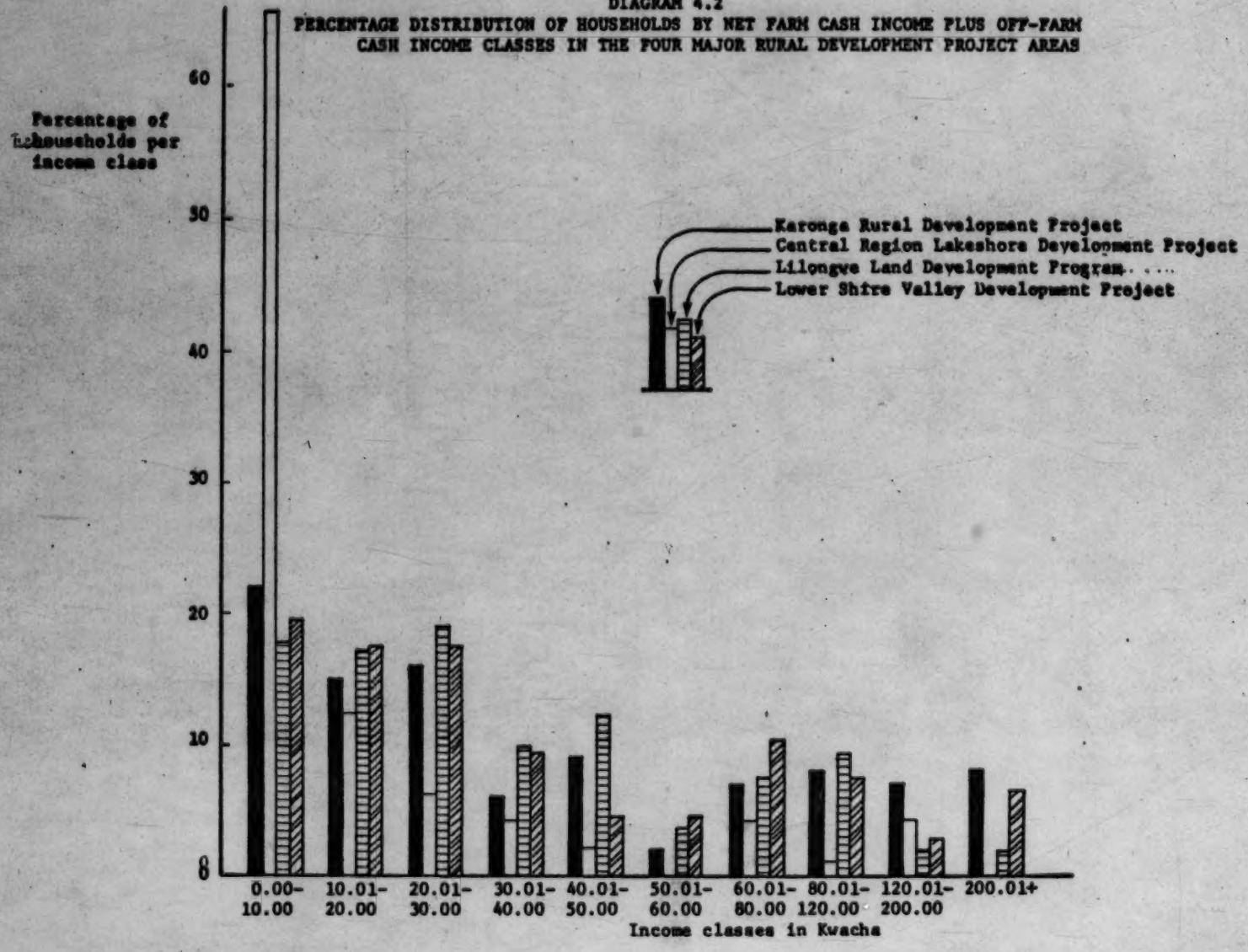


TABLE 4.3.1

AVERAGE RECORDED CASH INCOMES PER HOUSEHOLD BY NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME GROUPS - MALAWI (KWACHA)

Economic Class	Gross Farm Cash Income (G)	Net Farm Cash Income (N)	Net Farm Cash Income Plus Off-Farm Cash Income (N_w)	Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers (N_t)
0 - 10.00	2.46[a]	1.40[a]	3.55[a]	9.62[a]
10.01 - 20.00	8.70	7.05	15.60	21.53
20.01 - 30.00	14.67	12.12	25.48	30.52
30.01 - 40.00	20.16	17.04	36.87	43.12
40.01 - 50.00	20.04	15.99	44.98	48.94
50.01 - 60.00	25.10	19.04	53.80	69.97
60.01 - 80.00	27.69	20.82	69.56	73.41
80.01 - 120.00	37.04	27.21	98.98	104.17
120.01 - 200.00	53.50	40.76	152.59	161.75
200.00+	48.86	22.03	384.62	395.77
All Households	12.63	9.34	33.64	39.87

[a] Weighed average of the original two lowest income groups.

SOURCE: Malawi Government, National Sample Survey of Agriculture 1968/69, Table R6.13, pp. 29-40.

TABLE 4.3.2

AVERAGE RECORDED CASH INCOMES PER HOUSEHOLD BY NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME GROUPS - NORTHERN REGION (KWACHA)

Economic Class	Gross Farm Cash Income (G)	Net Farm Cash Income (N)	Net Farm Cash Income Plus Off-Farm Cash Income (N_w)	Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers (N_t)
0 - 10.00	2.40[a]	1.63[a]	3.17[a]	12.31[a]
10.01 - 20.00	9.17	7.81	14.52	22.81
20.01 - 30.00	22.51	20.59	29.94	41.42
30.01 - 40.00	21.46	19.34	34.46	42.33
40.01 - 50.00	26.47	23.23	46.21	51.83
50.01 - 60.00	32.02	29.59	54.72	62.48
60.01 - 80.00	34.03	29.26	71.38	75.48
80.01 - 120.00	39.39	30.90	95.95	99.96
120.01 - 200.00	53.13	42.93	147.01	153.97
200.01+	26.19	16.97	403.28	417.22
All Households	13.16	11.01	34.33	43.04

[a] Weighed average of the original two lowest income groups.

SOURCE: Malawi Government, National Sample Survey of Agriculture 1968/69, Table R6.13, pp. 29-40.

TABLE 4.3.3

AVERAGE RECORDED CASH INCOMES PER HOUSEHOLD BY NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME GROUPS - CENTRAL REGION (KWACHA)

Economic Class	Gross Farm Cash Income (G)	Net Farm Cash Income (N)	Net Farm Cash Income Plus Off-Farm Cash Income (N_w)	Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers (N_t)
0 - 10.00	2.86[a]	2.24[a]	4.13[a]	8.48[a]
10.01 - 20.00	9.71	7.99	16.62	21.64
20.01 - 30.00	15.42	13.58	24.48	27.81
30.01 - 40.00	24.67	21.43	35.12	42.74
40.01 - 50.00	28.00	23.70	44.64	49.33
50.01 - 60.00	38.30	31.27	52.95	66.77
60.01 - 80.00	53.73	46.90	69.45	74.47
80.01 - 120.00	61.08	52.28	103.24	110.07
120.01 - 200.00	74.01	60.20	158.82	176.20
200.01+	113.25	93.46	424.50	433.78
All Households	17.08	14.36	31.04	36.71

[a] Weighed average of the original two lowest income groups.

SOURCE: Malawi Government, National Sample Survey of Agriculture 1968/69, Table R6.13, pp. 29-40.

TABLE 4.3.4

AVERAGE RECORDED CASH INCOME PER HOUSEHOLD BY NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME GROUPS - SOUTHERN REGION (KWACHA)

Economic Class	Gross Farm Cash Income (G)	Net Farm Cash Income (N)	Net Farm Cash Income Plus Off-Farm Cash Income (N_w)	Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers (N_t)
0 - 10.00	2.20[a]	0.79[a]	3.52[a]	9.62[a]
10.01 - 20.00	7.66	6.01	15.00	21.05
20.01 - 30.00	11.64	8.28	24.98	29.52
30.01 - 40.00	14.98	11.67	39.50	43.78
40.01 - 50.00	12.85	8.70	44.92	47.96
50.01 - 60.00	17.34	11.38	54.14	72.51
60.01 - 80.00	14.24	7.02	69.33	72.58
80.01 - 120.00	27.79	17.29	98.06	102.90
120.01 - 200.00	35.78	23.32	148.61	151.19
200.01+	32.36	-1.73	365.52	373.04
All Households	9.37	5.38	35.29	41.26

[a] Weighed average of the original two lowest income groups.

SOURCE: Malawi Government, National Sample Survey of Agriculture 1968/69, Table R6.13, pp. 29-40.

income plus off-farm cash income per household at K35.29 while the Northern Region had the highest average household net farm cash income plus off-farm cash income plus cash transfers at K43.04 (Table 4.3).

The distributions of income according to the various definitions of income for Malawi as a whole, for the regions, the districts and the selected natural areas are presented in Appendix B.

Reliability of the Data

Survey data pose a number of problems which are conventionally classified into sampling errors and non-sampling errors. The 1968/69 N.S.S.A. report lists the following categories of non-sampling errors:[1]

(a) Inaccuracies in the sample weights resulting from incorrect assumptions about the universe.

(b) Weaknesses in the methods used to collect the data.

(c) Inaccuracies in the replies of the respondent.

(d) Bias resulting from non-response.

(e) Errors made by the enumerator when recording the information.

(f) Errors made when coding or punching the information for processing.

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[1] Ibid., p. xv.

(g) Errors made when processing the punch cards.

(h) Errors in the printing and publishing of the data.

Non-sampling errors from categories (e), (f), (g), and (h) "are thought to have been greatly reduced by the supervision in the field, the quality control of the edit and coding, the 100 percent verification of the punching and the systematic checking of the returns from the computer and the final work sheets."[1] The extent of inaccuracies resulting from the other non-sampling error categories, (a), (b), (c), and (d), were gauged using other independent sources of information.

The most serious discrepancy noted between the different definitions of rural cash incomes data contained in the 1968/69 N.S.S.A. report and other independent sources of information is an underestimation of gross farm cash income by 37 percent compared to the National Accounts estimate.[2] This underestimation is thought to have resulted from crops being sold in small quantities throughout the year and respondents not being able to remember all their sales. Other discrepancies between the 1968/69 N.S.S.A. data used in this study and other independent sources of information are minor and no clear trend of over- or underestimation is apparent. However, as a result of the noted underestimation

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[1] Ibid.

[2] Ibid., p. xxiii.

of gross farm cash income, it is estimated that the 1968/69 N.S.S.A. underestimated net farm cash income by 44 percent, net farm cash income plus off-farm cash income by 18 percent, and net farm cash income plus off-farm cash income plus cash transfers by 16 percent.[1] No attempt has been made in this study to correct for these underestimations because the 1968/69 N.S.S.A. report does not specify how much underestimation occurs in each of the economic classes used for the income distributions.

The 1968/69 N.S.S.A. report gives the coefficients of variation for some of the data as an indication of sampling errors. Unfortunately, the report does not give the coefficients of variation for the average recorded cash receipts per household data on which the income distributions presented in Appendix B were based.

One of the two major limitations of the data for purposes of measuring income distribution is the use of the frequency distribution of households according to one definition of income (net farm cash income plus off-farm cash income) in the construction of all the distributions of the different definitions of income presented in Appendix B. Each definition of income has a particular distribution of households by income groups which may shift the distribution of households by net farm cash income plus off-farm cash income groups. However, the 1968/69 N.S.S.A. data do

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[1] Ibid., p. xxv.

not allow one to reorder the distribution of households according to each definition of income.

The second major limitation of the data is the absence of data on the distribution of non-monetary incomes.[1] A substantial part of rural incomes in Malawi is in non-monetary form (Table 1.2) and the inclusion of such incomes may alter the level and distribution of incomes and give a more accurate picture of the income inequality problem in the rural areas of Malawi. This author's guess is that inclusion of non-monetary income would improve the level and distribution of rural incomes in Malawi.

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[1] The 1968/69 N.S.S.A. report contains data on the average volumes of various foods consumed by a household for the whole country, the 3 regions and the 23 districts. However, the data are insufficient for purposes of estimating the distribution of income in kind.

CHAPTER V

INCOME DISTRIBUTION IN MALAWI, 1968/69

Measures Used in This Study

Five summary measures of inequality were computed for each district, each region, Malawi as a whole, and each of the four major project areas.[1] The measures computed include the standard deviation of logarithms, Atkinson's measure of inequality, the Gini coefficient, the variance and the coefficient of variation. The results are presented in Tables 5.1 and 5.8.

The standard deviation of logarithms and Atkinson's measure of inequality have a theoretical appeal for measuring income distribution inequality when the bulk of the households fall in the low income group as is the case in Malawi. This study makes use of the standard deviation of logarithms for the purpose of measuring income distribution in Malawi. However, complete rankings of income distribution inequality by the standard deviation of logarithms are not possible for some cases when net farm income is con-

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[1] The standard deviation of logarithms and the Gini coefficient were not calculated for distributions which had negative total income accruing to any one single group of the distribution.

TABLE 5.1.1

SUMMARY MEASURES OF THE 1968/69 DISTRIBUTION OF RURAL CASH INCOME BY DEFINITION OF INCOME AND BY DISTRICT, REGION AND MALAWI AS A WHOLE (GROSS FARM CASH INCOME)

District/Region	Standard Deviation of Logarithms	Atkinson's Measure of Inequality $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Chitipa	.5378	.7374	.4933	177.3	0.9502
Karonga	.5715	.8465	.3971	210.6	0.7431
Nkhata Bay	.5903	.7465	.5359	155.9	1.1203
Rumpi	.5496	.7455	.4988	195.4	.9650
Mzimba	.5080	.6945	.5151	146.0	1.0462
NORTHERN REGION	.5421	.7335	.5057	171.8	.9973
Kasungu	.4509	.6398	.5009	208.3	1.0663
Nkhota Kota	.8165	.8805	.7153	7255.3	2.6219
Ntchisi	.5708	.7449	.5911	413.7	1.3232
Dowa	.5458	.7642	.5344	576.1	1.0861
Salima	.5845	.7596	.5813	308.1	1.2662
Lilongwe	.5096	.7278	.5283	490.2	1.1315
Mchinji	.6443	.8244	.5747	839.6	1.1418
Dedza	.5009	.6784	.5650	282.6	1.4110

TABLE 5.1.1 (CONTINUED)

District/Region	Standard Deviation of Logarithms	Atkinson's Measure of Inequality $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Ncheu	1.1860	.9639	.7307	555.2	1.7308
CENTRAL REGION	.5501	.7430	.5683	458.3	1.2539
Mangochi	.4410	.5989	.4896	45.0	1.0557
Kasupe	.4065	.5922	.4364	56.9	.8966
Zomba	.4584	.6401	.4851	72.9	.9895
Chiradzulu	.4222	.6297	.4239	75.5	.8502
Blantyre	.4480	.6724	.4437	103.3	.8576
Thyolo	.4844	.6822	.4928	98.0	.9811
Mulanje	.4639	.6565	.4699	72.5	.9299
Chikwawa	.4346	.6600	.4347	101.2	.8346
Nsanje	.4359	.6275	.4567	74.1	.9377
SOUTHERN REGION	.4575	.6527	.4717	78.8	.9486
ALL MALAWI	.5116	.7094	.5165	172.4	1.0383

TABLE 5.1.2

SUMMARY MEASURES OF THE 1968/69 DISTRIBUTION OF RURAL CASH INCOME BY DEFINITION OF INCOME AND BY DISTRICT, REGION AND MALAWI AS A WHOLE (NET FARM CASH INCOME)

District/Region	Standard Deviation of Logarithms	Atkinson's Measure of Inequality $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Chitipa	.5892	.7825	.4958	126.7	.9586
Karonga	.4979	.7765	.3684	139.0	.7062
Nkhata Bay	1.2230	.9600	.7246	30898.5	4.0168
Rumpi	.5996	.7876	.5011	139.5	.9696
Mzimba	.5620	.7457	.5308	108.2	1.0612
NORTHERN REGION	.5993	.7821	.5118	123.3	1.0098
Kasungu	.4614	.6518	.5077	152.2	1.0784
Nkhota Kota	.5613	.7483	.5515	189.2	1.1821
Ntchisi	.5962	.7657	.5994	293.7	1.3275
Dowa	.5596	.7776	.5360	407.4	1.0795
Salima	.6442	.8036	.5989	221.9	1.2862
Lilongwe	.5177	.7368	.5279	338.6	1.1152
Mchinji	.6670	.8399	.5760	580.2	1.1371
Dedza	.5250	.7025	.5772	200.0	1.4213

TABLE 5.1.2 (CONTINUED)

District/Region	Standard Deviation of Logarithms	Atkinson's Measure of Inequality $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Ncheu	.6120	.7660	.6340	365.8	1.5329
CENTRAL REGION	.5688	.7600	.5731	321.6	1.2489
Mangochi	.9463	.9130	.6378	24.3	1.3271
Kasupe	--	.6531	--	19.0	0.0911
Zomba	--	.7415	--	27.0	1.0855
Chiradzulu	--	.6799	--	30.4	0.8679
Blantyre	--	.7365	--	35.9	0.9768
Thyolo	--	.8339	--	41.2	1.0735
Mulanje	--	.8082	--	30.2	1.0234
Chikwawa	--	.7068	--	37.9	.8914
Nsanje	--	.6802	--	26.3	.9853
SOUTHERN REGION	--	.7805	--	31.1	1.0322
ALL MALAWI	.5771	.7735	.5154	89.4	1.0106

TABLE 5.1.3

SUMMARY MEASURES OF THE 1968/69 DISTRIBUTION OF RURAL CASH INCOME BY DEFINITION OF INCOME AND BY DISTRICT, REGION AND MALAWI AS A WHOLE (NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME)

District/Region	Standard Deviation of Logarithms	Atkinson's Measure of Inequality $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Chitipa	.7318	.8603	.6779	4721.8	1.9416
Karonga	.6469	.8607	.6028	6282.2	1.5415
Nkhata Bay	1.0172	.9281	.7898	11776.1	2.2382
Rumpi	.7150	.8507	.6674	4301.2	1.8788
Mzimba	.6137	.7834	.6216	1518.0	1.7564
NORTHERN REGION	.7524	.8640	.6988	5029.7	2.0697
Kasungu	.4565	.6537	.4935	515.3	1.0859
Nkhota Kota	.5682	.7571	.5719	1405.1	1.6539
Ntchisi	.8606	.8937	.7309	20415.0	2.6927
Dowa	.6019	.8100	.6015	4373.3	1.6368
Salima	.6364	.8004	.6097	1232.9	1.5708
Lilongwe	.5645	.7781	.5915	3522.7	1.6550
Mchinji	.7177	.8648	.6346	4481.3	1.4233
Dedza	.5538	.7328	.6096	1691.9	1.9907

TABLE 5.1.3 (CONTINUED)

District/Region	Standard Deviation of Logarithms	Atkinson's Measure of Inequality $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Ncheu	.6909	.8184	.7082	4933.5	2.3486
CENTRAL REGION	.6114	.7942	.6282	3282.9	1.8461
Mangochi	.6929	.8107	.6505	604.1	1.5017
Kasupe	.6667	.8217	.6772	4405.8	2.0997
Zomba	.7574	.8589	.7027	4607.3	2.0114
Chiradzulu	.6490	.8275	.6176	3675.0	1.6204
Blantyre	.7683	.8903	.6751	8542.4	1.6600
Thyolo	.6978	.8427	.6096	3028.0	1.8924
Mulanje	.7321	.8566	.6437	2661.4	1.6223
Chikwawa	.7042	.8640	.6556	6842.7	1.6462
Nsanje	.7231	.8513	.6870	5279.2	1.9229
SOUTHERN REGION	.7430	.8628	.6774	4214.8	1.8321
ALL MALAWI	.6952	.8409	.6652	3957.8	1.8702

TABLE 5.1.4

SUMMARY MEASURES OF THE 1968/69 DISTRIBUTION OF RURAL CASH INCOME BY DEFINITION OF INCOME AND BY DISTRICT, REGION AND MALAWI AS A WHOLE (NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME PLUS CASH TRANSFERS)

District/Region	Standard Deviation of Logarithms	Atkinson's Measure of Inequality $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Chitipa	.4313	.6014	.5376	4762.4	1.5711
Karonga	.4277	.6243	.5116	6358.0	1.3350
Nkhata Bay	.5934	.7358	.6623	12016.6	1.8953
Rumpi	.4309	.6016	.5317	4362.1	1.5072
Mzimba	.3355	.4641	.4379	1494.7	1.2537
NORTHERN REGION	.4380	.6051	.5503	5075.5	1.6590
Kasungu	.3567	.5131	.4256	589.0	.9362
Nkhota Kota	.4061	.5790	.4873	1550.0	1.4019
Ntchisi	.4646	.6397	.5567	2701.6	1.6075
Dowa	.4802	.6863	.5492	4734.9	1.4873
Salima	.4237	.5942	.5063	1374.2	1.3224
Lilongwe	.4562	.6561	.5388	3902.3	1.4956
Mchinji	.5907	.7733	.6183	8357.9	1.5447
Dedza	.4003	.5612	.5099	1861.3	1.6714

TABLE 5.1.4 (CONTINUED)

District/Region	Standard Deviation of Logarithms	Atkinson's Measure of Inequality $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Ncheu	.5189	.6859	.6236	5331.4	2.0598
CENTRAL REGION	.4689	.6557	.5588	3595.8	1.6341
Mangochi	.3508	.4733	.4426	569.5	1.0399
Kasupe	.4624	.6374	.5734	4444.9	1.7830
Zomba	.5015	.6721	.5942	4621.8	1.7143
Chiradzulu	.4627	.6552	.5378	3673.4	1.4249
Blantyre	.5590	.7437	.6100	8583.0	1.5096
Thyolo	.4957	.6738	.5682	3712.6	1.4311
Mulanje	.4484	.6219	.5048	2431.3	1.3822
Chikwawa	.5243	.7167	.5889	6883.5	1.4781
Nsanje	.5070	.6846	.5964	5302.5	1.6849
SOUTHERN REGION	.4900	.6681	.5752	4215.5	1.5680
ALL MALAWI	.4730	.6523	.5665	4067.3	1.6000

sidered. Under such circumstances, rankings of income distribution inequality according to Atkinson's measure of inequality are used as the next best alternative rankings using an arbitrary value of $\varepsilon = 3$. It should be emphasized that these are synthetic indices and the use of a single figure to measure income distribution inequality misses some aspects of income distribution inequality.

For purposes of ranking and comparing the various income distributions, emphasis is placed on the relative values of the standard deviations of logarithms, or on Atkinson's measure of inequality, rather than on their absolute values since no meaningful statistical test of significance exists by which differences between the absolute values of these measures can be discerned. In lieu of a significance test on the absolute values of the measures, an analysis of variance on the various regional and district income distributions (Table B.2, Appendix B) was conducted in order to determine whether the distributions were significantly different.

Analysis of variance provides a basis for comparing any number of series simultaneously. The results of the analysis of variance for the regional and district distributions are presented in Table 5.2. The F-ratios lead to the conclusion, with 99.999 percent of confidence, that both the regional and district income distributions have different means and variances, i.e., the distributions are significantly different.

TABLE 5.2.1

ANALYSIS OF VARIANCE OF THE DISTRIBUTION OF INCOME BY DEFINITION OF INCOME (REGIONAL DISTRIBUTIONS)

Definition of Income	Source of Variation	Variation of Sum of Squared Deviations	Degrees of Freedom	Variance	F-ratio[a]
Gross Farm Cash Income	Within regional distributions	200,904,390	885,216	226	24,628
	Between regional distributions	11,132,205	2	5,566,102	
Net Farm Cash Income	Within regional distributions	130,341,441	885,216	147	52,238
	Between regional distributions	15,357,857	2	7,678,929	
Net Farm Cash Income Plus Off-Farm Cash Income	Within regional distributions	3,529,774,395	885,216	3,987	429
	Between regional distributions	3,425,125	2	1,712,562	
Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers	Within regional distributions	3,635,792,947	885,216	4,107	634
	Between regional distributions	5,206,978	2	2,603,489	

[a] F-ratio = $\frac{\text{Between Regional Distributions Variance}}{\text{Within Regional Distributions Variance}}$

TABLE 5.2.2

ANALYSIS OF VARIANCE OF THE DISTRIBUTION OF INCOME BY DEFINITION OF INCOME (DISTRICT DISTRIBUTIONS)

Definition of Income	Source of Variation	Variation of Sum of Squared Deviations	Degrees of Freedom	Variance	F-ratio[a]
Gross Farm Cash Income	Within district distributions	890,134,369	885,139	1,005	501
	Between district distributions	11,097,926	22	504,451	
Net Farm Cash Income	Within district distributions	865,258,738	885,139	977	715
	Between district distributions	15,383,098	22	699,231	
Net Farm Cash Income Plus off-Farm Cash Income	Within district distributions	3,626,667,744	885,139	4,097	37
	Between district distributions	3,424,001	22	155,636	
Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers	Within district distributions	3,519,496,438	885,139	3,976	59
	Between district distributions	5,208,776	22	236,762	

[a] $\text{F-ratio} = \frac{\text{Between District Distributions Variance}}{\text{Within District Distributions Variance}}$

National Income Distribution Inequality, 1968/69

The cumulative percentage income and household data presented in Table B.2 in Appendix B gives the Lorenz curve description of the 1968/69 rural cash income distribution in Malawi. Comparing the lowest and highest income groups one finds that 42.56 percent of the households were in the lowest income group (K0.00 - K10.00) and accounted for only 8.26 percent of total gross farm cash income, 6.36 percent of net farm cash income, 4.49 percent of total net farm cash income plus off-farm cash income, and 10.27 percent of total net farm cash income plus off-farm cash income plus cash transfers. On the other hand, only 2.3 percent of the households were in the highest income bracket (K200.01 and over) but they accounted for 8.8 percent of gross farm cash income, 5.41 percent of net farm cash income, 26.27 percent of net farm cash income plus off-farm cash income, and 22.81 percent of net farm cash income plus off-farm cash income plus cash transfers.

Using the standard deviation of logarithms as an overall measure of income distribution inequality, the results indicate that net farm cash income plus off-farm cash income was the most unequally distributed rural cash income while net farm cash income plus off-farm cash income plus cash transfers was the least unequally distributed rural cash income in 1968/69 (Table 5.3).

TABLE 5.3

RANKING OF THE 1968/69 RURAL CASH INCOME DISTRIBUTIONS IN MALAWI BY STANDARD DEVIATION OF LOGARITHMS

Definition of Income	Standard Deviation of Logarithms	Ranking of Income Distribution from the Least Unequal to the Most Unequal Distribution
Gross Farm Cash Income	.5116	2
Net Farm Cash Income	.5771	3
Net Farm Cash Income Plus Off-Farm Cash Income	.6952	4
Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers	.4730	1

The difference between the inequality in the distributions of net farm cash income plus off-farm cash income and net farm cash income plus off-farm cash income plus cash transfers can be partly explained by the disparity in labour endowment between households. Households with their most healthy male labour working in urban centers, on estates and in neighbouring countries are limited in their capability to grow cash crops and/or take up off-farm employment within the rural areas. As a result the absent male labour force causes considerable inequality in cash incomes generated within the rural areas when all households are considered together. However, most people employed outside the rural area send money to members of their household in the rural area thereby compensating for the disparity in rural cash incomes which arises from labour endowment. The available data do not allow a test of the above hypothesis and it is beyond the scope of this study to identify and explain the economic factors causing the shifts in the distributions of the various definitions of rural cash income.

A comparison of income distribution inequality in Malawi with income distribution inequality in other developing countries was made in an attempt to find if the 1968/69 level of income distribution inequality in Malawi was consistent with that in the other developing countries. The Gini coefficient has been widely used in international comparisons of income inequality. Using net farm cash income

plus off-farm cash income plus cash transfers as the best estimate of rural cash incomes in Malawi a Gini coefficient of 0.5655 (Table 5.1.4) for 1968/69 was close to reported Gini coefficients for other developing countries. A study of personal income distribution in the agricultural sector in Colombia for 1960 estimated a Gini coefficient of 0.58[1] and a more recent study of cocoa producers in Western Nigeria came up with a Gini coefficient of 0.78[2] for the period 1967-69. Because of heterogeneous factors, it is difficult to generalize about the relative inequality of personal income distribution from these Gini coefficients.

Regional Income Distribution Inequality, 1968/69

As in the national income distributions, the uppermost classes in the regional income distributions accounted for a disproportionate share of income. In the Northern Region the uppermost class (K200.01 and over) accounted for only 2.51 percent[3] of households but earned 5.79 percent

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[1] R.A. Berry, "Farm Size Distribution, Income Distribution, and the Efficiency of Agricultural Production: Colombia," The American Economic Review, 62 (May, 1972), p. 403.

[2] S.M. Essang, "The Distribution of Earnings in the Cocoa Economy of Western Nigeria: Implications for Development" (Ph.D. Thesis, Michigan State University, 1970), p. 44.

[3] All percentage shares in this paragraph are from Table B.2 in Appendix B.

of gross farm cash income, 4.48 percent of net farm cash income, 34.23 percent of net farm cash income plus off-farm cash income and 28.23 percent of net farm cash income plus off-farm cash income plus cash transfers. In the Central Region the uppermost class accounted for 1.4 percent of households but received 9.29 percent of gross farm cash income, 9.11 percent of net farm cash income, 9.15 percent of net farm cash income plus off-farm cash income and 16.93 percent of net farm cash income plus off-farm cash income plus cash transfers. In the Southern Region only 2.8 percent of the households were in the uppermost class but they accounted for 9.67 percent of gross farm cash income, -0.89 percent of net farm cash income, 28.85 percent of net farm cash income plus off-farm cash income and 25.20 percent of net farm cash income plus off-farm cash income cash transfers. For all three regions at least 40 percent of the households were in the lowest income class (K0.00 - K10.00) and they accounted for no more than 12.98 percent of any definition of rural cash income.

The rankings of regional income distributions by the standard deviation of logarithms and Atkinson's measure are presented in Table 5.4. The rankings show that the Southern Region had the most equal distribution of gross farm cash income while the Central Region had the most unequal regional distribution of gross farm cash income. The Nothern Region had the most unequal distribution of net farm cash income, while the Central Region had the most

TABLE 5.4

RANKING OF REGIONS FROM MOST EQUAL DISTRIBUTION OF INCOME TO LEAST EQUAL BY DEFINITION OF INCOME

Measure of Inequality	Gross Farm Cash Income			Net Farm Cash Income			Net Farm Cash Income Plus Off-Farm Cash Income			Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers		
	North	Central	South	North	Central	South	North	Central	South	North	Central	South
Standard Deviation of Logs	2	3	1	-	-	-	3	1	2	1	2	3
Atkinson's Measure c = 3	2	3	1	3	1	2	3	1	2	1	2	3

equal distribution. Net farm cash income plus off-farm cash income was again most unequal in the Northern Region and most equal in the Central Region. Net farm cash income plus off-farm cash income plus cash transfers was least unequal in the Northern Region and most unequal in the Southern Region. For all three regions the standard deviation of logarithms and Atkinson's measure of inequality indicated that net farm cash income plus off-farm cash income plus cash transfers was the least unequally distributed definition of rural income in 1968/69 except for the Southern Region where gross farm cash income had the lowest value of Atkinson's measure (Table 5.1). Net farm cash income plus off-farm cash income was the most unequally distributed definition of rural cash income in all three regions.

District Income Distribution Inequality, 1968/69

Rankings of district income distributions by the various summary measures are presented in Table 5.5. The rankings indicate that there is considerable discrepancy in the rankings by the various measures. These ranking discrepancies are not very surprising when you consider that each summary measure of inequality places emphasis on different aspects of the distribution of income as pointed

TABLE 5.5.1

RANKINGS OF DISTRICTS FROM MOST EQUAL TO LEAST EQUAL DISTRIBUTION OF INCOME BY MEASURE OF INEQUALITY AND DEFINITION OF RURAL CASH INCOME (GROSS FARM CASH INCOME)

District	Standard Deviation of Logarithms	Atkinson's Measure $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Chitipa	14	14	11	12	8
Karonga	18	21	1	15	1
Nkhata Bay	20	17	17	11	16
Rumpi	16	16	12	13	11
Mzimba	12	12	14	10	12
Kasungu	7	5	13	14	14
Nkhota Kota	22	22	22	23	22
Ntchisi	17	15	21	18	20
Dowa	15	19	16	21	15
Salima	19	18	20	17	19
Lilongwe	13	13	15	19	17
Mchinji	21	20	19	22	18
Dedza	11	10	18	16	21
Ncheu	23	23	23	20	23
Mangochi	5	2	9	1	13
Kasupe	1	1	4	2	5
Zomba	8	6	8	4	10
Chiradzulu	2	4	2	6	3
Blantyre	6	9	5	9	4
Thyolo	10	11	10	7	9
Mulanje	9	7	7	3	6
Chikwawa	3	8	3	8	2
Nsanje	4	3	6	5	7

TABLE 5.5.2

RANKINGS OF DISTRICTS FROM MOST EQUAL TO LEAST EQUAL DISTRIBUTION OF INCOME BY MEASURE OF INEQUALITY AND DEFINITION OF RURAL CASH INCOME (NET FARM CASH INCOME)

District	Standard Deviation of Logarithms	Atkinson's Measure $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Chitipa	--	16	--	11	5
Karonga	--	14	--	12	1
Nkhata Bay	--	23	--	23	23
Rumpi	--	17	--	13	6
Mzimba	--	10	--	10	10
Kasungu	--	1	--	14	12
Nkhota Kota	--	11	--	15	17
Ntchisi	--	12	--	18	20
Dowa	--	15	--	21	13
Salima	--	18	--	17	18
Lilongwe	--	8	--	19	15
Mchinji	--	21	--	22	16
Dedza	--	5	--	16	21
Ncheu	--	13	--	20	22
Mangochi	--	22	--	2	19
Kasupe	--	2	--	1	4
Zomba	--	9	--	4	14
Chiradzulu	--	3	--	6	2
Blantyre	--	7	--	7	7
Thyolo	--	20	--	9	11
Mulanje	--	19	--	5	9
Chikwawa	--	6	--	8	3
Nsanje	--	4	--	3	8

TABLE 5.5.3

RANKINGS OF DISTRICTS FROM MOST EQUAL TO LEAST EQUAL DISTRIBUTION OF INCOME BY MEASURE OF INEQUALITY AND DEFINITION OF RURAL CASH INCOME (NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME)

District	Standard Deviation of Logarithms	Atkinson's Measure $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Chitipa	18	17	17	16	18
Karonga	8	18	5	19	4
Nkhata Bay	23	23	22	22	22
Rumpi	15	13	14	11	15
Mzimba	6	5	9	5	14
Kasungu	1	1	1	1	1
Nkhota Kota	4	3	2	4	10
Ntchisi	22	22	21	23	13
Dowa	5	7	4	12	8
Salima	7	6	7	3	5
Lilongwe	3	4	3	9	11
Mchinji	16	20	10	14	2
Dedza	2	2	6=	6	19
Ncheu	11	9	20	17	23
Mangochi	12	8	12	2	3
Kasupe	10	10	16	13	21
Zomba	20	16	19	15	20
Chiradzulu	9	11	8	10	6
Blantyre	21	21	15	21	12
Thyolo	13	12	6=	8	16
Mulanje	19	15	11	7	7
Chikwawa	14	19	13	20	9
Nsanje	17	14	18	18	17

TABLE 5.5.4

RANKINGS OF DISTRICTS FROM MOST EQUAL TO LEAST EQUAL DISTRIBUTION OF INCOME BY MEASURE OF INEQUALITY AND DEFINITION OF RURAL CASH INCOME (NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME PLUS CASH TRANSFERS)

District	Standard Deviation of Logarithms	Atkinson's Measure $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Chitipa	9	7	10	16	16
Karonga	7	10	8	19	5
Nkhata Bay	23	21	23	23	22
Rumpi	8	8	9	12	13
Mzimba	1	1	2	4	3
Kasungu	3	3	1	2	1
Nkhota Kota	5	5	4	5	7
Ntchisi	14	12	14	8	17
Dowa	15	19	13	15	11
Salima	6	6	6	3	4
Lilongwe	11	14	12	11	12
Mchinji	22	23	21	21	15
Dedza	4	4	7	6	18
Ncheu	19	18	22	18	23
Mangochi	2	2	3	1	2
Kasupe	12	11	16	13	21
Zomba	17	16	18	14	20
Chiradzulu	13	13	11	9	8
Blantyre	21	22	20	22	14
Thyolo	16	15	15	10	9
Mulanje	10	9	5	7	6
Chikwawa	20	20	17	20	10
Nsanje	18	17	19	17	19

out in Chapter III. The Spearman rank correlation test[1] was used to test the ranking discrepancy between the rankings by the standard deviation of logarithms and the rankings by the other summary measures. The results of the test show that the null hypothesis (i.e., that the ranking of net farm cash income plus off-farm cash income by the standard deviation of logarithms is unrelated to the ranking by the coefficient of variation) cannot be rejected at the 0.01 percent significance level (Table 5.6). The rest of the rankings are, with 99.99 percent confidence, essentially the same as the ranking by the standard deviation of logarithms.

Dividing the districts into three levels of relative inequality in the distribution of rural cash income provided a simple method for comparing district income distribution inequality. Group one consisted of the seven districts ranked most equal, group two consisted of the next seven districts in the district rankings and group three was composed of the nine lowest ranked districts. The results of the groupings are shown on Maps 5.1 to 5.4 and are summarized in Table 5.7.

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[1] Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences (Toronto: McGraw-Hill Book Company, 1956).

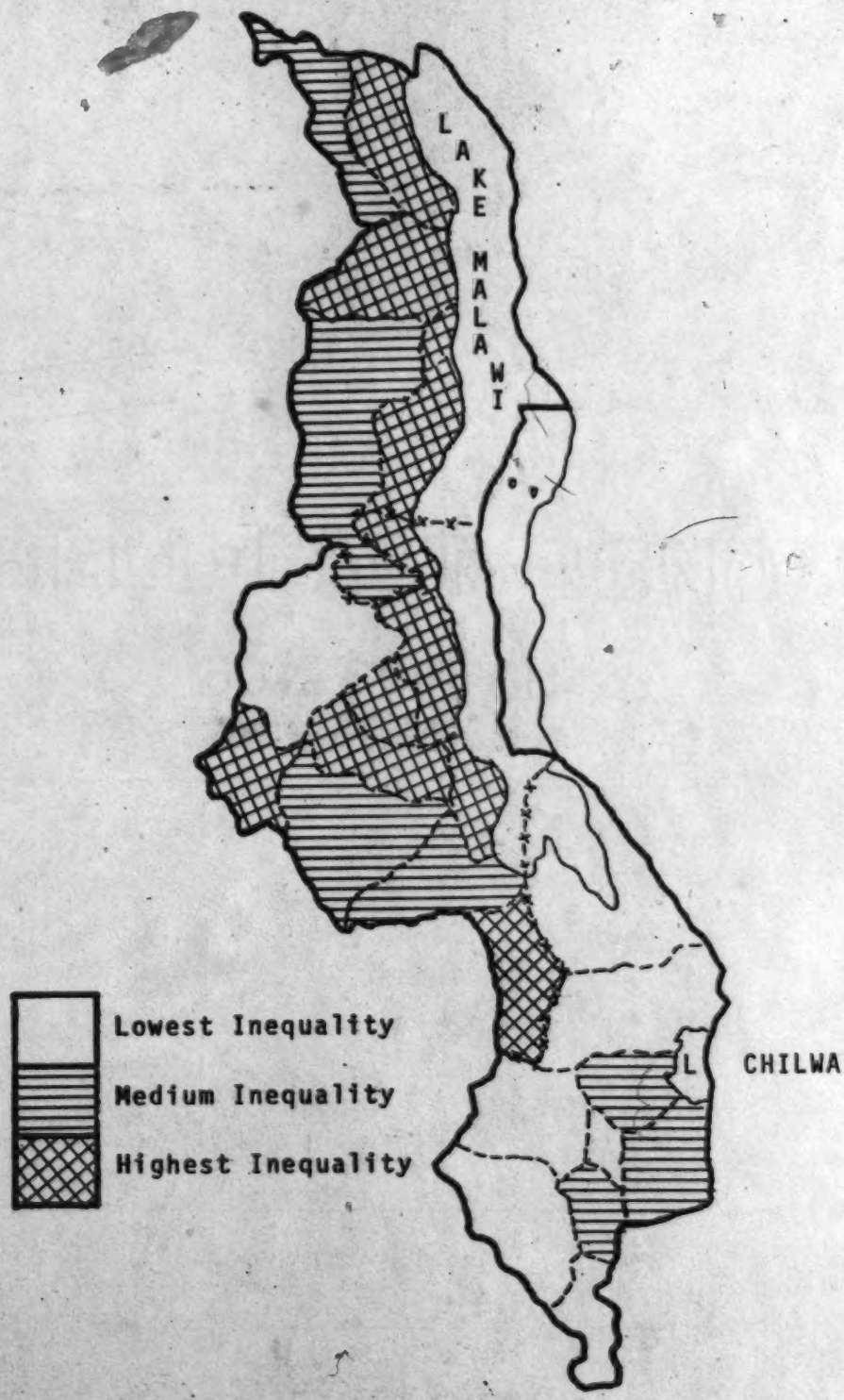
TABLE 5.6

SPEARMAN RANK CORRELATION COEFFICIENTS OF DISTRICT RANKINGS

Definition of Income	Standard Deviation of Logarithms Versus: Atkinson's Measure $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Gross Farm Cash Income	.9496	.7670	.8094	.6751
Net Farm Cash Income	--	--	--	--
Net Farm Cash Income Plus Off-Farm Cash Income	.8914	.8277	.6815	.3216*
Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers	.9733	.9546	.8302	.6485

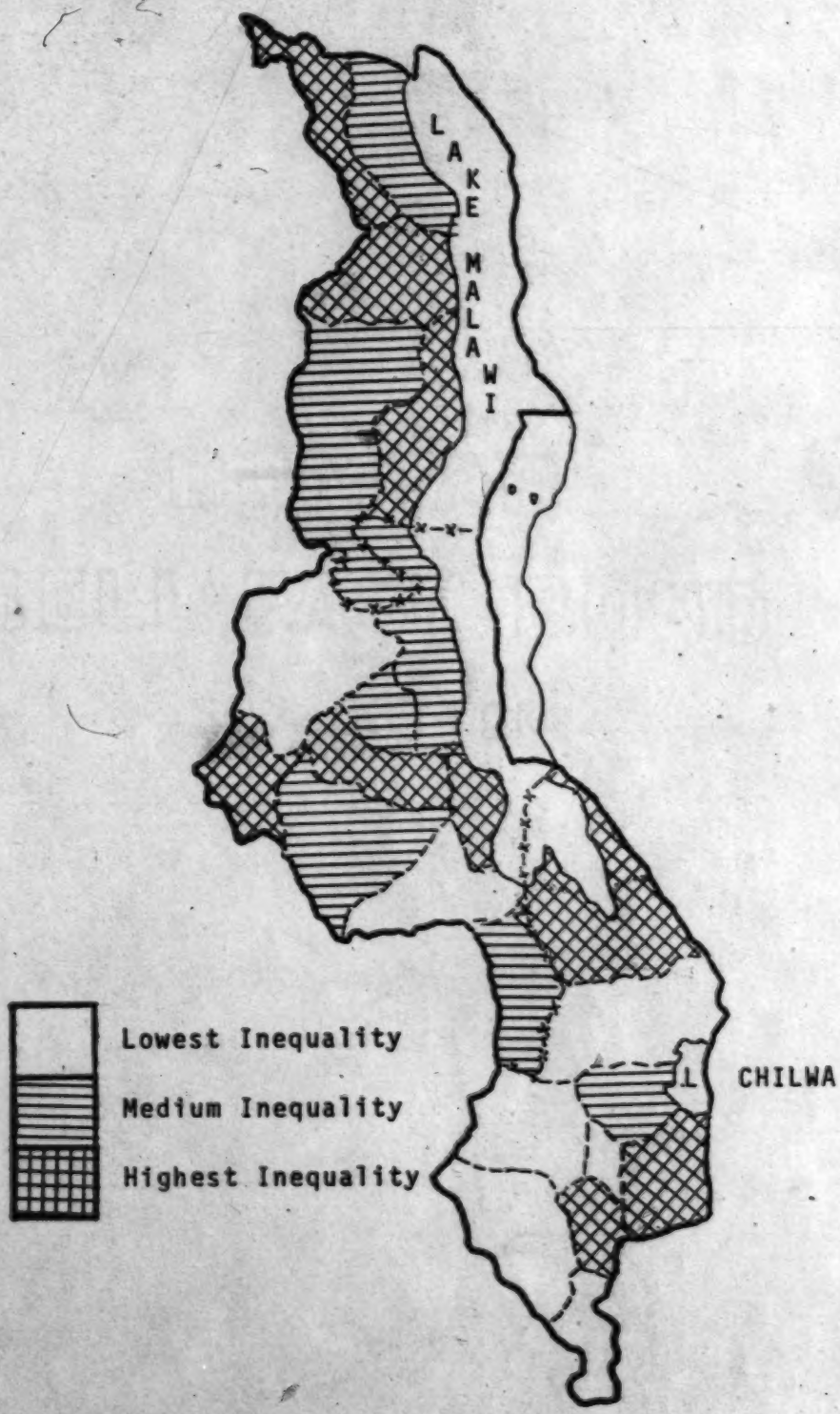
* Not significant at the 0.01 percent significance level.

MAP 5.1



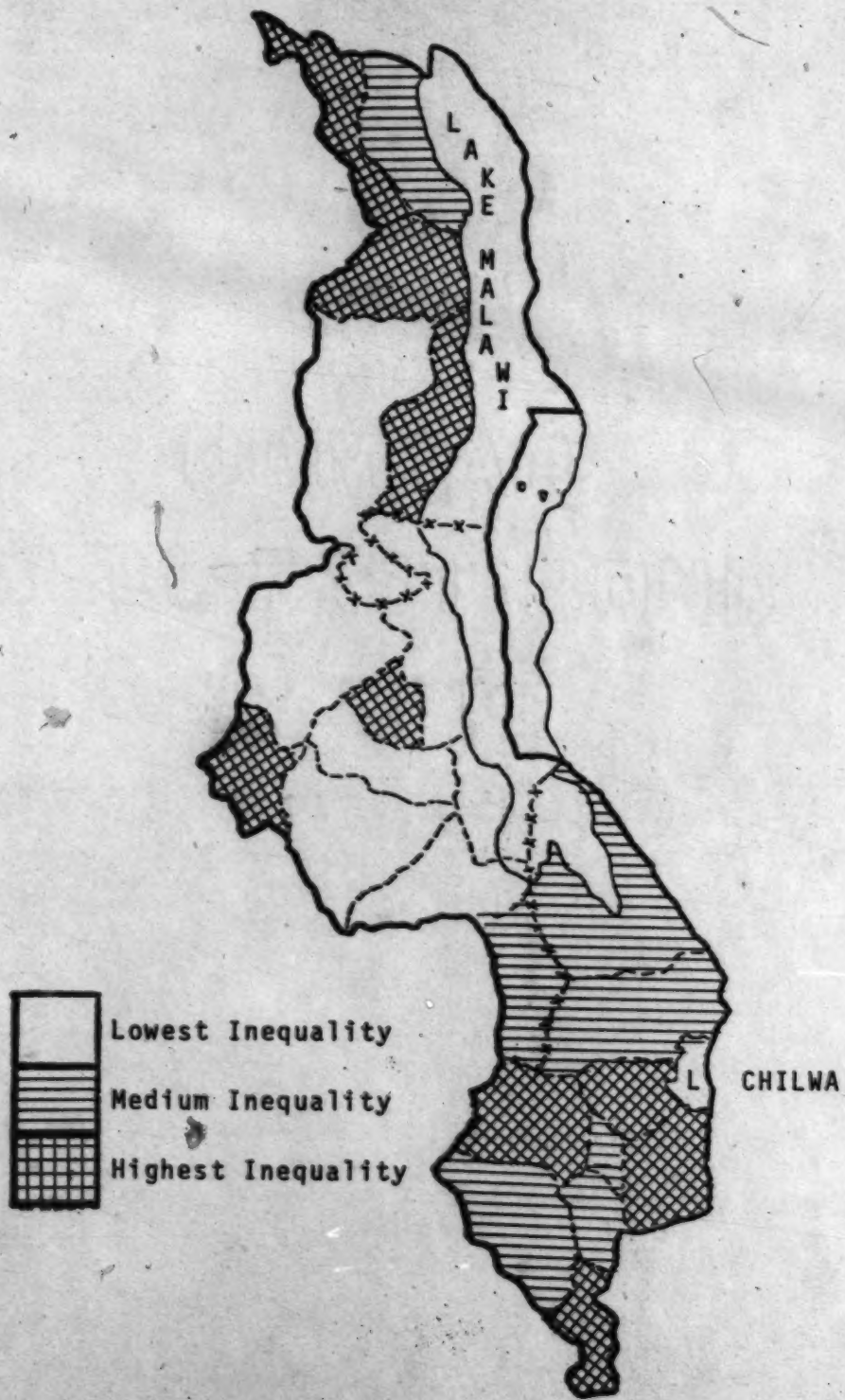
LEVELS OF DISTRICT INCOME INEQUALITY IN THE DISTRIBUTION OF GROSS FARM CASH INCOME

MAP 5.2



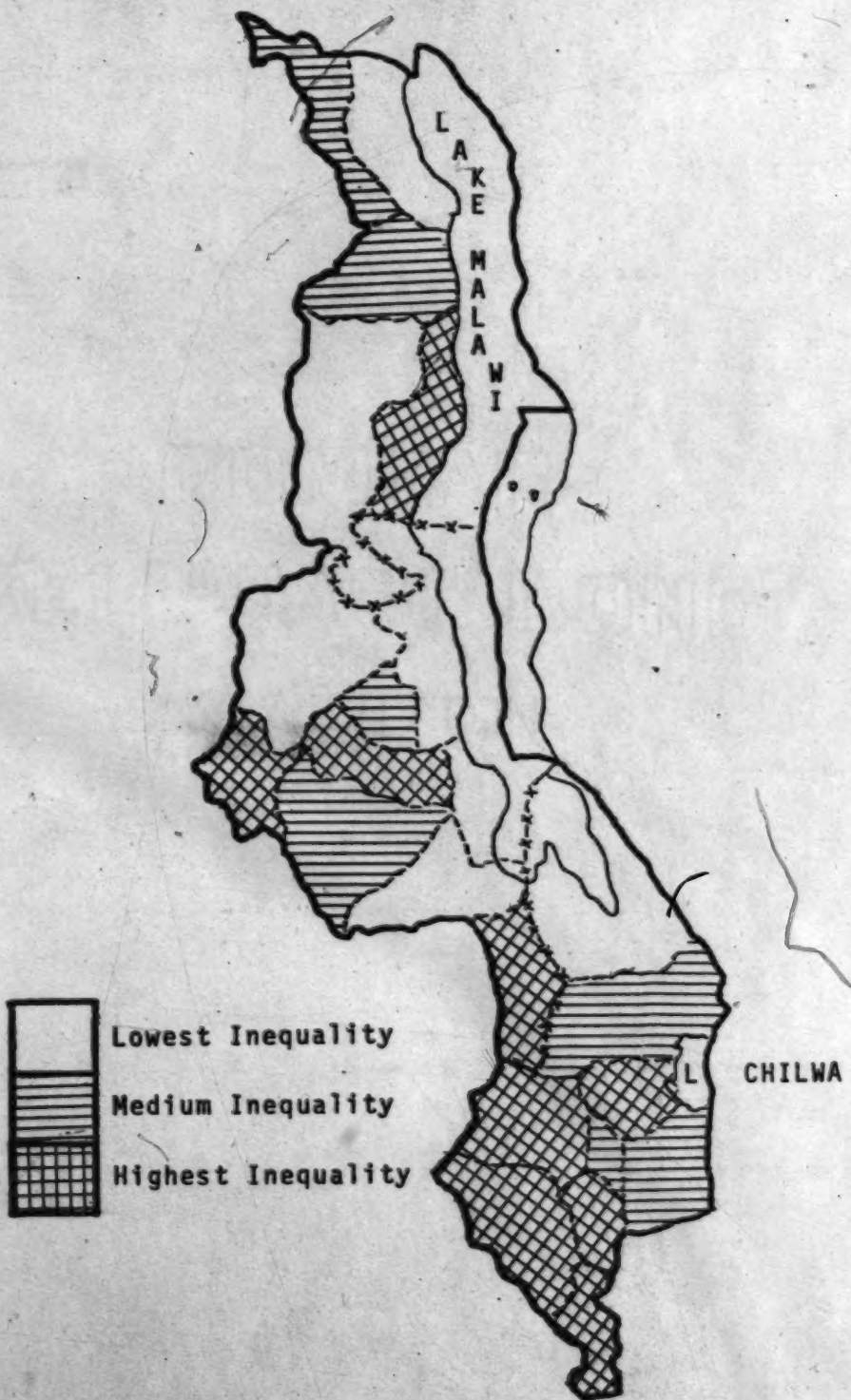
LEVELS OF DISTRICT INCOME INEQUALITY IN THE DISTRIBUTION OF NET FARM CASH INCOME

MAP 5.3



LEVELS OF DISTRICT INCOME INEQULAITY IN THE DISTRIBUTION OF NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME

MAP 5.4



LEVELS OF DISTRICT INCOME INEQUALITY IN THE DISTRIBUTION OF NET FARM CASH INCOME PLUS OFF-FARM CASH INCOME PLUS CASH TRANSFERS

TABLE 5.7

SUMMARY RESULTS OF DISTRICT RELATIVE INEQUALITY GROUPING

Definition of Income	Relative Inequality Group	Number of Districts Per Inequality by Region		
		Northern	Central	Southern
Gross Farm Cash income	Lowest inequality	0	1	6
	Medium inequality	2	2	3
	Highest inequality	3	6	0
Net Farm Cash Income	Lowest inequality	0	2	5
	Medium inequality	2	4	1
	Highest inequality	3	3	3
Net Farm Cash Income Plus Off-Farm Cash Income	Lowest inequality	1	6	0
	Medium inequality	1	1	5
	Highest inequality	3	2	4
Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers	Lowest inequality	2	4	1
	Medium inequality	2	2	3
	Highest inequality	1	3	5

District Income Distribution and the Distribution of Rural Development Projects in Malawi

Rural development projects in Malawi are planned to provide employment opportunities in the rural areas and balance farm budgets which would provide the rural people with large increases in net income. Income generated within the rural areas (net farm cash income plus off-farm cash income) is therefore used as a basis for the comparison of income distribution inequality and the location of the major rural development projects.

The results indicate that none of the four major rural development projects operating in 1973 (Karonga Rural Development Project, Central Region Lakeshore Development Project, Lilongwe Land Development Program, and Lower Shire Valley Development Project) were located in the districts categorized as depicting the highest level of income distribution inequality in 1968/69. The Lilongwe Land Development Program and the Central Region Lakeshore Development Project were in districts which showed relatively the lowest level of inequality. The Lower Shire Valley Development Project and the Karonga Rural Development Project were in districts which depicted medium inequality levels.

The results of the measurement of the 1968/69 income distribution inequality in the four major project areas are presented in Table 5.8. The Lilongwe Land Development

TABLE 5.8

SUMMARY MEASURES OF THE 1968/69 DISTRIBUTION OF INCOME IN THE MAJOR PROJECT AREAS BY DEFINITION OF INCOME

Definition of Income	Project Area	Standard Deviation of Logarithms	Atkinson's Measure $\varepsilon = 3$	Gini Coefficient	Variance	Coefficient of Variation
Gross Farm Cash Income	KRDP	.5011	.7804	.3595	217.3	.6976
	CRCLP	.6112	.7487	.6455	333.0	1.6196
	LLDP	.4575	.7111	.4564	363.9	.8769
	LSVDP	.3756	.6203	.3618	83.1	.6896
Net Farm Cash Income	KRDP	.5499	.8297	.3389	148.0	.6974
	CRLDP	.6809	.7954	.6734	237.8	1.6663
	LLDP	.4575	.7101	.4541	363.9	.8796
	LSVDP	--	.6301	--	29.7	.6043
Net Farm Cash Income Plus Off-Farm Cash Income	KRDP	.7649	.9160	.6365	11,197.6	1.5085
	CRLDP	.6843	.7986	.6873	1,191.7	1.8566
	LLDP	.4883	.7445	.5144	3,692.7	1.3671
	LSVDP	.6275	.8464	.6043	7,523.3	1.4975
Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers	KRDP	.5065	.7129	.5639	11,416.9	1.3588
	CRLDP	.4414	.5890	.5466	1,345.0	1.5112
	LLDP	.4166	.6412	.4779	4,003.1	1.2635
	LSVDP	.4454	.6296	.5360	7,513.4	1.3492

KRDP = Karonga Rural Development Project.
CRLDP = Central Region Lakeshore Development Project.
LLDP = Lilongwe Land Development Program.
LSVDP = Lower Shire Valley Development Project.

Program and Lower Shire Valley Development Project areas had lower levels of inequality in the distribution of both net farm cash income plus off-farm cash income and net farm cash income plus off-farm cash income plus cash transfers than the respective district inequality levels (Lilongwe and Chikwawa districts, respectively, Table 5.1). Both Karonga Rural Development Project and Central Region Lakeshore Development Project areas had higher levels of inequality in the distribution of net farm cash income plus off-farm cash income and net farm cash income plus off-farm cash income plus cash transfers than the respective district inequality levels (Karonga and Salima districts, respectively, Table 5.1). It would be interesting for policy purposes to analyze the effects of these four rural development projects on income distribution inequality. The 1968/69 results of income inequality in Malawi (Tables 5.1 and 5.8) form a good basis for such an analysis since there were no major rural development projects prior to 1968.[1] However, such an exercise is beyond the scope of this study.

General Conclusions

The results indicate that rural incomes in Malawi were

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[1] Lilongwe Land Development Program was the first major rural development project. It was launched in 1968 but it was preceded by a pilot project in effect from 1965 to 1967.

unequally distributed in 1968/69. The uppermost income groups accounted for a disproportionate share of income compared to the proportion of households. Income generated within the rural areas (net farm cash income plus off-farm cash income) was the most unequally distributed income on a national level, in the Northern and Central Regions and in all 23 districts. Gross farm cash income was the most unequally distributed income in the Southern Region. Net farm cash income plus off-farm cash income plus cash transfers was the least unequally distributed income at all levels.

With respect to the distribution of rural development projects the results show that no major rural development project was located in the nine districts which had the lowest inequality level in the distribution of the 1968/69 net farm cash income plus off-farm cash income. Two of the four project areas showed lower levels of inequality than their respective district inequalities and the other two project areas showed higher levels of inequality than the distribution of their respective districts' net farm cash income plus off-farm cash income and net farm cash income plus off-farm cash income plus cash transfers.

CHAPTER VI

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this study was (a) to measure the level and degree of the 1968/69 rural income distribution inequality in Malawi and (b) to find out if the distribution of rural development projects meets the government's strategy of spreading the fruits of development as evenly as possible throughout all sections of the population and all parts of the country.

A number of limitations are inherent in this study. In the first place, the estimates of income distribution presented in the study do not accurately reflect the inequality of lifetime income. A second limitation arises from the absence of income in kind and cost of living differences between regions and income groups. Nevertheless, with all these limitations in mind, several conclusions may be inferred from the results presented in the preceding chapter.

Conclusions

The first conclusion is that rural cash incomes, regardless of definition of rural cash income, were unequally distributed in 1968/69 on all three levels, i.e., national, regional and district. The uppermost groups

accounted for a disporportionate share of income.

A second conclusion is that income generated within the rural area (net farm cash income plus off-farm cash income) was the most unequally distributed income on all levels except in the Southern Region where gross farm cash income showed the most serious disparity. Net farm cash income plus off-farm cash income plus cash transfers was the least unequally distributed income.

The third conclusion is that the level and degree of regional income distribution inequality corresponded to the development emphasis placed on the three regions during the colonial era. Using net farm cash income plus off-farm cash income plus cash transfers as an estimate of total rural cash income, the regional inequality results indicated that cash income was least unequally distributed in the Northern Region, where development emphasis was minimal, and most unequally distributed in the Southern Region, where most of the development emphasis was placed during the colonial era. This conclusion seems to contradict the claim that economic development generates "forces that operate to make the income distribution more equal."[1] However, other factors such as the population density mentioned in Chapter I may have contributed to the differences in income distribution disparity rather than economic develop-

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[1] I. Kravis, "International Differences in the Distribution of Income," Review of Economics and Statistics, 42 (November, 1960), p. 414.

ment alone. It is beyond the scope of this study to identify and analyze factors which could account for the differences in the levels of the 1968/69 income distribution inequality in Malawi.

Fourth, the district inequality results indicated that Nkhata Bay and Mchinji districts had the most unequal income distribution in 1968/69 while Kasungu district had the least unequal distribution. Nkhata Bay and Mchinji districts were classed under the most unequal income distribution group for all definitions of income while Kasungu was the only district classed under the least unequal distribution group for all definitions of income (Maps 5.1 and 5.4).

The fifth conclusion is that none of the four major rural development projects (Karonga Rural Development Project, Central Region Lakeshore Development Project, Lilongwe Land Development Program and Lower Shire Valley Development Project) were in districts which had the most unequal distribution of income generated within the rural areas. It will be an interesting proposition for future investigation to see what effect these four major rural development projects have had on the level of income distribution within the project areas and on the regional levels of income inequality.

Recommendations

The study has documented in quantitative terms the rural income distribution disparity in Malawi on a national, regional and district level for the first time. However, calculating the level and degree of income inequality depends to some extent upon the accuracy and limitations of the data being used. There is a definite need for more accurate data which would take into account not only cash income but also income in kind and cost-of-living differences between regions and different income groups. The first recommendation, therefore, is that income distribution data collection be incorporated into regular surveys and censuses of Malawi.

A second recommendation is that a further study into how to reduce income inequality in Malawi should be undertaken. An attempt should be made to identify and examine the leading factors contributing to income distribution inequality. Reasons for inequality of incomes (and of earnings) have been studied and quantified for a number of countries. Therefore, using similar techniques, it should be possible to carry out a detailed study of Malawi in order to identify leading factors which contribute to more or less equal income distributions.

Finally, development projects should at least be neutral to the distribution of income; otherwise, the level of inequality within project areas or on a national level

may worsen. Income distribution within each rural development project should, therefore, be included as an additional criterion for project performance in order to ensure that development is improving, rather than worsening, the distribution of income.

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APPENDIX A

APPENDIX A

LINEAR APPROXIMATION OF THE GINI COEFFICIENT

The Gini coefficient is defined as the area between the diagonal and the Lorenz curve (area A in Diagram A.1) divided by the total area under the diagonal (A + B)[1], i.e., A/A + B. The area under the diagonal,

$$A + B = \frac{1}{2} (100 \times 100)$$

$$= 5000$$

$$\text{Gini coefficient} = \frac{A}{A+B} = \frac{A+B-B}{A+B} = \frac{A+B}{A+B} - \frac{B}{A+B}$$

$$= \frac{5000}{5000} - \frac{B}{5000}$$

$$= 1 - \frac{B}{5000}$$

Area B can be calculated by finding the areas of the m trapeziums and summing them up as follows:

Area of a trapezium = $\frac{1}{2}$ (distance between parallel sides of trapezium) x (sum of the parallel sides of the trapezium)

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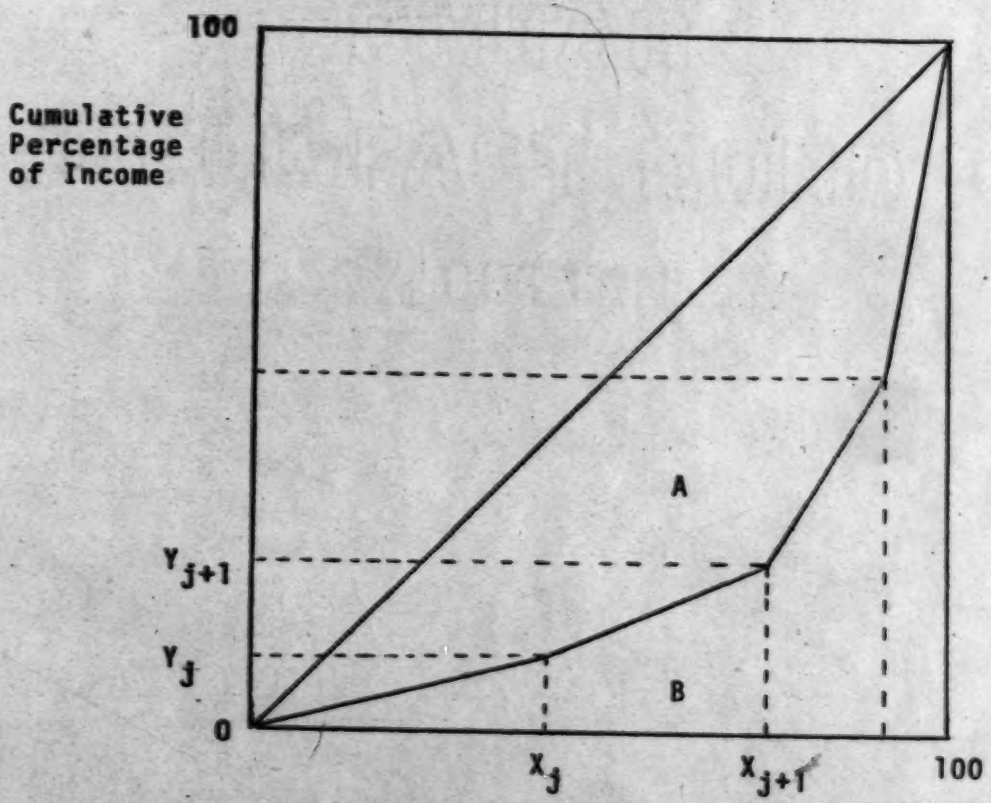
[1] Sen, On Economic Inequality, p. 30.

DIAGRAM A.1

LINEAR APPROXIMATION OF GINI COEFFICIENT



In Diagram A.1

Distance between parallel sides of trapezium = the percentage difference of households per group between adjacent groups

$$= X_{j+1} - X_j \quad \text{where} \quad X_1 = 0$$

Sum of parallel sides = sum of the cumulative percentage of income for the two adjacent groups

$$= Y_j + Y_{j+1} \quad \text{where} \quad Y_1 = 0$$

$$\therefore B = \sum_{j=1}^{m} \frac{1}{2} (X_{j+1} - X_j)(Y_j + Y_{j+1})$$

$$\therefore \text{Gini coefficient} = 1 - \frac{\sum_{j=1}^{m} \frac{1}{2} (X_{j+1} - X_j)(Y_j + Y_{j+1})}{5000}$$

APPENDIX B

TABLE B.1

DISTRIBUTION OF INCOME BY ECONOMIC CLASS AND BY DEFINITION OF INCOME

MALAWI

Economic Class	Number of Households (H)	Gross Farm Cash Income (G)	Net Farm Cash Income (N)	Net Farm Cash Income Plus Off-Farm Cash Income (N_W)	Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers (N_T)
0.00 - 10.00	377,010	925,905	527,415	1,336,581	3,625,137
10.01 - 20.00	170,805	1,486,004	1,204,175	2,664,558	3,677,432
20.01 - 30.00	93,810	1,376,193	1,136,977	2,390,279	2,863,081
30.01 - 40.00	58,410	1,177,546	995,306	2,153,577	2,518,639
40.01 - 50.00	35,400	709,416	566,046	1,592,292	1,732,476
50.01 - 60.00	25,665	644,192	488,662	1,380,777	1,795,780
60.01 - 80.00	46,020	1,274,294	958,136	3,201,151	3,378,328
80.01 - 120.00	30,975	1,147,314	842,830	3,065,906	3,226,666
120.01 - 200.00	27,435	1,467,773	1,118,251	4,186,307	4,437,611
200.01 +	20,355	994,545	448,421	7,828,940	8,055,898

TABLE B.1 (CONTINUED)

SOUTHERN REGION

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	197,087	434,304	156,343	640,718	1,895,229
10.01 - 20.00	78,925	604,566	474,339	1,183,875	1,661,371
20.01 - 30.00	43,296	503,965	358,491	1,081,534	1,278,098
30.01 - 40.00	24,354	364,823	284,211	961,983	1,066,218
40.01 - 50.00	18,491	237,609	162,166	830,616	886,828
50.01 - 60.00	15,785	273,712	179,633	854,600	1,144,570
60.01 - 80.00	27,962	378,179	196,293	1,938,606	2,029,482
80.01 - 120.00	19,844	551,465	343,103	1,945,903	2,041,948
120.01 - 200.00	13,079	467,967	305,002	1,943,670	1,977,414
200.01 +	12,628	408,648	-21,846	4,615,787	4,710,749

CENTRAL REGION

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	126,760	362,635	283,764	524,050	1,074,519
10.01 - 20.00	70,035	680,040	559,580	1,163,982	1,518,359
20.01 - 30.00	37,077	571,727	503,506	907,645	1,031,111
30.01 - 40.00	25,669	633,254	550,087	901,495	1,097,093
40.01 - 50.00	12,993	363,804	307,934	580,008	640,945
50.01 - 60.00	8,239	315,554	257,634	436,255	550,118
60.01 - 80.00	13,310	715,146	624,239	924,380	991,196
80.01 - 120.00	7,289	445,212	381,069	752,516	802,300
120.01 - 200.00	11,092	820,919	667,738	1,761,631	1,954,410
200.01 +	4,437	502,490	414,682	1,883,507	1,969,052

TABLE B.1 (CONTINUED)

NORTHERN REGION

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	52,929	126,921	86,285	167,813	651,637
10.01 - 20.00	21,546	197,577	168,274	312,848	491,464
20.01 - 30.00	13,115	295,219	270,038	392,663	543,223
30.01 - 40.00	7,963	170,886	154,004	274,405	337,074
40.01 - 50.00	4,567	120,889	106,228	211,041	236,708
50.01 - 60.00	1,757	56,259	51,990	96,143	109,777
60.01 - 80.00	4,216	143,471	123,360	300,938	318,224
80.01 - 120.00	4,099	161,460	126,659	393,299	409,736
120.01 - 200.00	3,279	174,213	140,768	482,046	504,868
200.01 +	3,396	88,941	57,630	1,369,403	1,416,879

CHITIPA

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	6,034	14,673	10,107	19,595	74,496
10.01 - 20.00	2,851	26,144	22,266	41,397	65,031
20.01 - 30.00	1,541	34,688	31,729	46,138	63,828
30.01 - 40.00	864	18,541	16,709	29,773	36,573
40.01 - 50.00	605	16,014	14,072	27,957	31,357
50.01 - 60.00	432	13,833	12,783	23,639	26,991
60.00 - 80.00	518	17,628	15,157	36,975	39,099
80.01 - 120.00	864	34,033	26,698	82,901	86,365
120.01 - 200.00	302	16,045	12,965	44,397	46,499
200.01 +	389	10,188	6,601	156,860	162,299

TABLE B.1 (CONTINUED)

KARONGA

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	3,612	5,086	6,452	12,421	44,847
10.01 - 20.00	3,360	30,811	26,242	48,787	76,642
20.01 - 30.00	2,638	59,381	54,316	78,982	109,266
30.01 - 40.00	1,898	40,731	36,707	65,405	80,342
40.01 - 50.00	974	25,782	22,655	45,009	50,482
50.01 - 60.00	470	15,049	13,907	25,718	29,366
60.01 - 80.00	1,193	40,598	34,907	85,156	90,048
80.01 - 120.00	974	38,366	30,096	93,455	97,361
120.01 - 200.00	1,025	54,458	44,003	150,685	157,819
200.01 +	638	16,709	10,827	257,267	266,186

NKHATA BAY

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	14,280	31,277	19,338	38,513	173,172
10.01 - 20.00	1,632	14,965	12,746	23,697	37,226
20.01 - 30.00	1,944	43,759	40,027	58,203	80,520
30.01 - 40.00	1,632	35,023	31,563	56,239	69,083
40.01 - 50.00	960	25,411	22,329	44,362	49,757
50.01 - 60.00	336	10,759	9,942	18,386	20,993
60.01 - 80.00	0	0	0	0	0
80.01 - 120.00	960	37,814	867,969	92,112	95,962
120,01 - 200.00	336	17,852	14,424	49,395	51,734
200.01 +	1,944	50,913	32,989	783,899	811,076

TABLE B.1 (CONTINUED)

RUMPI

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	4,017	9,907	6,913	13,953	49,699
10.01 - 20.00	1,535	14,076	11,988	22,288	35,013
20.01 - 30.00	1,014	22,825	20,878	30,359	42,000
30.01 - 40.00	595	12,769	11,507	20,504	25,186
40.01 - 50.00	595	15,749	13,839	27,495	30,839
50.01 - 60.00	177	5,668	5,237	9,686	11,059
60.01 - 80.00	428	14,565	12,523	25,911	32,305
80.01 - 120.00	363	14,299	11,217	34,830	36,286
120.01 - 200.00	363	19,286	15,584	53,361	55,891
200.01 +	214	5,605	3,632	86,293	89,285

MZIMBA

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	24,985	62,016	43,526	84,010	309,472
10.01 - 20.00	12,203	111,902	95,305	177,188	278,350
20.01 - 30.00	5,996	134,970	123,458	179,520	248,354
30.01 - 40.00	2,998	64,337	57,981	103,311	126,905
40.01 - 50.00	1,368	36,211	31,820	63,215	70,903
50.01 - 60.00	421	13,480	12,458	23,037	26,472
60.01 - 80.00	2,157	73,403	63,114	153,967	162,810
80.01 - 120.00	948	37,342	29,293	90,960	94,762
120.01 - 200.00	1,262	67,050	54,178	185,527	194,310
200.01 +	263	6,888	4,463	106,052	109,729

TABLE B.1 (CONTINUED)

KASUNGU

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	10,379	33,764	27,539	49,615	89,412
10.01 - 20.00	7,217	70,077	57,664	119,947	156,465
20.01 - 30.00	2,219	34,217	30,134	54,321	61,710
30.01 - 40.00	1,913	47,194	40,996	67,184	81,762
40.01 - 50.00	1,352	37,856	32,042	60,353	66,694
50.01 - 60.00	944	36,155	29,519	49,985	63,031
60.01 - 80.00	918	49,324	43,054	63,755	68,364
80.01 - 120.00	383	23,394	20,023	39,541	42,157
120.01 - 200.00	179	13,248	10,776	28,429	31,540
200.01 +	0	0	0	0	0

NKHOTA KOTA

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	6,667	17,944	13,493	25,332	56,039
10.01 - 20.00	2,002	19,439	15,996	33,273	43,403
20.01 - 30.00	2,448	37,748	33,244	59,927	68,079
30.01 - 40.00	1,008	24,867	21,601	35,401	43,082
40.01 - 50.00	749	20,972	17,751	33,435	36,948
50.01 - 60.00	778	297,974	24,328	41,195	51,947
60.01 - 80.00	302	16,226	14,164	20,974	22,490
80.01 - 120.00	202	12,338	10,561	20,854	22,234
120.01 - 200.00	158	11,694	9,511	25,094	27,839
200.01 +	72	8,154	6,729	30,564	31,952

TABLE B.1 (CONTINUED)

NTCHISI

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	7,696	21,415	16,464	30,627	64,983
10.01 - 20.00	2,926	28,411	23,379	48,630	63,436
20.01 - 30.00	1,574	24,271	21,375	38,531	43,773
30.01 - 40.00	1,049	25,879	22,480	36,841	44,834
40.01 - 50.00	525	14,700	12,443	23,436	25,898
50.01 - 60.00	413	15,818	12,913	21,868	27,576
60.01 - 80.00	668	35,892	31,329	463,993	49,746
80.01 - 120.00	477	29,135	24,937	49,246	52,503
120.01 - 200.00	445	32,934	26,789	70,675	78,409
200.01 +	143	16,195	13,365	60,704	63,461

DOWA

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	11,804	34,629	27,517	50,501	100,423
10.01 - 20.00	8,954	86,943	71,542	148,815	194,123
20.01 - 30.00	5,291	81,587	71,852	129,524	147,143
30.01 - 40.00	3,948	97,397	84,606	138,654	168,738
40.01 - 50.00	1,994	55,832	47,258	89,012	98,364
50.01 - 60.00	1,425	54,578	44,560	75,454	95,147
60.01 - 80.00	2,442	131,209	114,530	169,596	181,856
80.01 - 120.00	2,849	174,017	148,946	294,131	313,589
120.01 - 200.00	1,180	87,332	71,036	187,408	207,916
200.01 +	855	96,829	79,908	362,948	379,432

TABLE B.1 (CONTINUED)

SALIMA

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	8,802	20,789	14,138	27,711	72,761
10.01 - 20.00	2,862	27,790	22,867	47,566	62,048
20.01 - 30.00	2,124	32,752	28,844	51,996	59,068
30.01 - 40.00	1,584	39,077	33,945	55,630	67,700
40.01 - 50.00	738	20,664	17,491	32,944	36,406
50.01 - 60.00	414	15,856	12,946	21,921	27,643
60.01 - 80.00	810	43,521	37,989	56,255	60,321
80.01 - 120.00	126	7,696	6,587	13,008	13,869
120.01 - 200.00	504	37,301	30,341	80,045	88,805
200.01 +	36	4,077	3,365	15,282	15,976

LILONGWE

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	27,587	84,203	68,457	124,489	236,078
10.01 - 20.00	22,275	216,290	177,977	370,211	482,922
20.01 - 30.00	14,073	217,006	191,111	344,507	391,370
30.01 - 40.00	11,836	291,994	253,646	415,680	505,871
40.01 - 50.00	3,728	104,384	88,354	166,418	183,902
50.01 - 60.00	1,584	60,667	49,532	83,873	105,764
60.01 - 80.00	4,101	220,347	192,337	284,814	305,401
80.01 - 120.00	1,212	74,029	63,363	125,127	133,405
120.01 - 200.00	5,499	406,981	331,039	873,351	968,924
200.01 +	1,305	147,791	121,965	553,973	579,133

TABLE B.1 (CONTINUED)

MCHINJI

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	6,194	16,855	12,769	23,898	52,141
10.01 - 20.00	2,906	28,217	23,219	48,298	63,002
20.01 - 30.00	1,340	20,663	18,197	32,803	37,265
30.01 - 40.00	1,096	27,038	23,487	38,492	46,843
40.01 - 50.00	1,079	30,212	25,572	48,167	53,227
50.01 - 60.00	992	37,994	31,020	52,526	66,236
60.01 - 80.00	783	42,071	36,723	54,379	58,310
80.01 - 120.00	1,027	62,729	53,692	106,028	113,042
120.01 - 200.00	1,322	97,841	79,584	209,960	232,936
200.01 +	696	78,822	65,048	205,452	308,871

DEDZA

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	27,270	76,127	58,606	108,943	230,353
10.01 - 20.00	13,716	133,182	109,591	227,960	297,363
20.01 - 30.00	5,508	84,933	74,799	134,836	153,178
30.01 - 40.00	1,620	39,965	34,717	56,894	69,239
40.01 - 50.00	1,404	39,312	33,275	62,675	69,259
50.01 - 60.00	918	35,159	28,706	48,608	61,295
60.01 - 80.00	1,620	87,043	75,978	112,509	120,641
80.01 - 120.00	432	26,387	22,585	44,599	47,550
120.01 - 200.00	1,134	83,927	68,267	180,102	199,810
200.01 +	324	36,693	30,281	137,538	143,785

TABLE B.1 (CONTINUED)

NCHEU

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	20,337	7,342	44,234	82,065	171,963
10.01 - 20.00	7,220	70,106	57,688	119,996	156,530
20.01 - 30.00	2,419	37,301	32,850	59,217	67,272
30.01 - 40.00	1,663	41,026	35,638	58,405	71,077
40.01 - 50.00	1,399	39,172	33,156	62,451	69,013
50.01 - 60.00	869	33,283	27,174	46,014	58,023
60.01 - 80.00	1,701	91,395	79,777	118,134	126,673
80.01 - 120.00	454	27,730	23,735	46,871	49,972
120.01 - 200.00	756	55,952	45,511	120,068	133,207
200.01 +	983	111,325	91,871	417,284	436,236

MANGOCHI

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	32,112	64,855	8,143	78,241	314,348
10.01 - 20.00	6,799	52,080	40,862	101,985	143,119
20.01 - 30.00	3,818	44,442	31,613	95,374	112,707
30.01 - 40.00	2,929	43,876	34,181	115,695	128,232
40.01 - 50.00	2,406	30,917	21,101	108,078	115,392
50.01 - 60.00	837	14,514	9,525	45,315	60,691
60.01 - 80.00	1,046	14,895	7,343	72,519	75,919
80.01 - 120.00	2,197	61,055	37,986	215,438	226,071
120.01 - 200.00	157	5,617	3,661	23,332	23,737
200.01 +	0	0	0	0	0

TABLE B.1 (CONTINUED)

KASUPE

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	22,792	52,835	25,737	85,651	216,718
10.01 - 20.00	12,037	92,203	72,342	180,555	253,378
20.01 - 30.00	8,239	95,902	68,219	205,810	243,215
30.01 - 40.00	1,338	20,043	15,614	52,581	58,578
40.01 - 50.00	1,498	19,249	13,137	67,290	71,844
50.01 - 60.00	1,605	27,831	18,265	86,895	116,379
60.01 - 80.00	2,782	39,616	19,530	192,876	201,918
80.01 - 120.00	803	22,315	13,884	78,742	82,629
120.01 - 200.00	642	22,971	14,971	95,408	97,064
200.01 +	1,766	57,148	-3,055	645,508	658,789

ZOMBA

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	24,900	55,656	22,058	84,428	238,705
10.01 - 20.00	7,916	60,637	47,575	118,740	166,632
20.01 - 30.00	3,407	39,658	28,210	85,107	100,575
30.01 - 40.00	4,058	60,789	47,357	160,291	177,659
40.01 - 50.00	1,052	13,518	9,226	47,256	50,454
50.01 - 60.00	1,303	22,594	14,828	70,544	94,481
60.01 - 80.00	3,056	43,517	21,453	211,872	221,805
80.01 - 120.00	2,004	55,691	34,649	196,512	206,212
120.01 - 200.00	752	26,907	17,537	111,755	113,695
200.01 +	1,653	53,491	-2,860	604,205	616,635

TABLE B.1 (CONTINUED)

CHIRADZULU

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	12,163	28,777	15,442	48,284	115,106
10.01 - 20.00	5,813	44,528	34,936	87,195	122,364
20.01 - 30.00	2,890	33,640	23,929	72,192	85,313
30.01 - 40.00	3,091	46,303	36,072	122,095	135,324
40.01 - 50.00	4,066	52,248	35,659	182,645	195,005
50.01 - 60.00	638	11,063	7,260	34,541	46,261
60.01 - 80.00	1,882	26,800	13,212	130,479	136,596
80.01 - 120.00	840	23,344	14,524	82,370	86,436
120.01 - 200.00	1,445	51,702	33,697	214,742	218,469
200.01 +	773	25,014	-1,337	282,547	288,360

BLANTYRE

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	13,874	31,267	13,041	48,174	132,764
10.01 - 20.00	9,609	73,605	57,750	144,135	202,270
20.01 - 30.00	4,715	54,883	39,040	117,781	139,187
30.01 - 40.00	1,616	24,208	18,858	63,832	70,749
40.01 - 50.00	2,739	35,196	24,021	123,036	131,362
50.01 - 60.00	1,392	24,137	15,841	75,363	100,934
60.01 - 80.00	3,637	51,791	25,532	252,153	263,973
80.01 - 120.00	2,021	56,164	34,943	198,179	207,961
120.01 - 200.00	2,245	80,326	52,353	333,630	339,422
200.01 +	3,143	101,708	-5,437	1,148,829	1,172,465

TABLE B.1 (CONTINUED)

THYOLO

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	23,964	51,695	15,745	72,980	231,488
10.01 - 20.00	9,674	74,103	58,141	145,110	203,638
20.01 - 30.00	4,893	56,955	40,514	122,227	144,441
30.01 - 40.00	2,224	33,316	25,954	87,848	97,367
40.01 - 50.00	2,669	34,297	23,407	119,892	128,005
50.01 - 60.00	2,057	35,668	23,409	111,366	149,153
60.01 - 80.00	2,669	38,007	18,736	185,042	192,716
80.01 - 120.00	3,058	84,982	52,873	316,244	314,668
120.01 - 200.00	3,225	115,391	75,207	47,927	487,588
200.01 +	1,112	35,984	-1,924	406,458	414,821

MULANJE

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	46,980	102,059	32,962	146,232	453,149
10.01 - 20.00	15,934	122,054	95,763	239,010	335,411
20.01 - 30.00	7,813	90,943	64,692	195,169	230,640
30.01 - 40.00	5,448	81,611	63,578	215,196	238,513
40.01 - 50.00	1,439	18,491	12,620	64,640	69,014
50.01 - 60.00	5,757	99,826	65,515	311,684	417,440
60.01 - 80.00	9,972	142,001	70,003	691,359	723,768
80.01 - 120.00	6,168	171,409	106,645	604,834	634,687
120.01 - 200.00	1,850	66,193	43,142	274,929	27,902
200.01 +	1,439	46,566	-2,489	525,983	536,805

TABLE B.1 (CONTINUED)

CHIKWAWA

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	9,723	22,649	11,301	37,023	92,348
10.01 - 20.00	7,359	56,369	44,228	110,385	154,907
20.01 - 30.00	4,129	48,062	34,188	103,142	121,888
30.01 - 40.00	2,264	33,915	26,421	89,428	99,118
40.01 - 50.00	1,532	19,686	13,436	68,817	73,475
50.01 - 60.00	1,765	30,605	20,086	95,557	127,980
60.01 - 80.00	1,099	15,650	7,715	76,194	79,765
80.01 - 120.00	1,832	50,911	31,675	179,646	188,513
120.01 - 200.00	1,898	67,910	44,261	282,062	286,959
200.01 +	1,732	56,048	-2,996	633,081	646,105

NSANJE

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	10,832	25,123	12,268	40,759	102,985
10.01 - 20.00	3,984	30,517	23,944	59,760	83,913
20.01 - 30.00	3,337	38,843	27,630	83,358	98,508
30.01 - 40.00	1,345	20,148	15,696	53,128	58,884
40.01 - 50.00	971	12,477	8,516	43,617	46,569
50.01 - 60.00	398	3,433	4,529	21,548	28,859
60.01 - 80.00	1,818	25,888	12,762	126,042	131,950
80.01 - 120.00	647	17,980	11,187	63,445	66,576
120.01 - 200.00	647	23,150	15,088	96,151	97,820
200.01 +	971	31,422	-1,680	354,920	362,222

TABLE B.1 (CONTINUED)

KARONGA RURAL DEVELOPMENT PROJECT (PART OF)

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	924	2,071	1,314	2,600	11,247
10.01 - 20.00	630	5,777	4,920	9,147	14,370
20.01 - 30.00	671	15,126	13,836	20,119	27,834
30.01 - 40.00	251	5,407	4,873	8,683	10,667
40.01 - 50.00	378	10,005	8,792	17,467	19,591
50.01 - 60.00	84	2,689	2,485	4,596	5,248
60.01 - 80.00	294	10,004	8,602	20,985	22,191
80.01 - 120.00	336	13,235	10,382	32,239	33,586
120.01 - 200.00	294	15,620	12,621	43,220	45,267
200.01 +	336	8,799	5,701	135,488	140,185

LILONGWE LAND DEVELOPMENT PROGRAM (PART OF)

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	2,385	8,085	6,940	12,354	20,749
10.01 - 20.00	2,304	22,371	18,408	38,292	49,950
20.01 - 30.00	2,546	39,259	34,574	62,326	70,804
30.01 - 40.00	1,313	32,391	28,137	46,112	56,117
40.01 - 50.00	1,648	46,144	39,057	73,566	81,295
50.01 - 60.00	495	18,958	15,478	26,210	33,051
60.01 - 80.00	991	53,246	46,477	68,824	73,799
80.01 - 120.00	1,232	75,250	64,408	127,191	135,606
120.01 - 200.00	241	17,836	14,508	38,275	42,464
200.01 +	241	27,293	22,523	102,304	106,950

TABLE B.1 (CONTINUED)

CENTRAL REGION LAKESHORE DEVELOPMENT PROJECT (PART OF)

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	5,518	12,754	8,509	16,825	45,500
10.01 - 20.00	1,041	10,108	8,317	17,301	22,568
20.01 - 30.00	520	8,018	7,061	12,729	14,461
30.01 - 40.00	352	8,683	7,543	12,362	15,044
40.01 - 50.00	176	4,928	4,171	7,856	8,682
50.01 - 60.00	0	0	0	0	00
60.01 - 80.00	352	18,912	16,508	24,446	26,213
80.01 - 120.00	84	5,130	4,391	8,672	9,245
120.01 - 200.00	352	26,051	21,190	55,904	62,022
200.01 +	0	0	0	0	0

LOWER SHIRE VALLEY DEVELOPMENT PROJECT (PART OF)

Economic Class	(H)	(G)	(N)	(N_W)	(N_T)
0.00 - 10.00	1,404	3,369	1,930	5,793	19,022
10.01 - 20.00	1,267	9,705	7,614	19,005	26,670
20.01 - 30.00	1,267	14,747	10,490	31,649	37,401
30.01 - 40.00	669	10,021	7,807	26,425	29,288
40.01 - 50.00	331	4,253	2,902	14,868	15,874
50.01 - 60.00	331	5,739	3,766	17,920	24,000
60.01 - 80.00	741	10,551	5,201	51,373	53,781
80.01 - 120.00	532	14,784	9,198	52,167	54,742
120.01 - 200.00	201	7,191	4,687	29,870	30,389
200.01 +	460	14,885	-795	168,139	171,598

TABLE B.2

CUMULATIVE PERCENTAGE DISTRIBUTION OF INCOME AND HOUSEHOLDS BY DEFINITION OF INCOME AND BY ECONOMIC CLASSES RANKED FROM LOWEST TO HIGHEST INCOME CLASS

MALAWI

Ranked Economic Classes	Households (H)	Gross Farm Cash Income (G)	Net Farm Cash Income (N)	Net Farm Cash Income Plus Off-Farm Cash Income (N_W)	Net Farm Cash Income Plus Off-Farm Cash Income Plus Cash Transfers (N_T)
1	42.56	8.26	6.36	4.49	10.27
2	61.84	21.53	20.90	13.43	20.68
3	72.43	33.81	34.62	21.45	28.79
4	79.02	44.32	46.63	28.67	35.92
5	83.02	50.66	53.46	34.02	40.83
6	85.91	56.41	59.36	38.65	45.91
7	91.11	67.78	70.92	49.39	55.48
8	94.61	78.02	81.09	59.68	64.62
9	97.70	91.12	94.59	73.73	77.19
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

NORTHERN REGION

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	45.29	8.26	6.71	4.19	12.98
2	63.73	21.13	19.81	12.01	22.77
3	74.95	40.35	40.82	21.83	33.59
4	81.76	51.48	52.80	28.69	40.31
5	85.67	59.35	61.06	33.96	45.03
6	87.17	63.01	65.11	36.37	47.21
7	90.78	72.35	74.71	43.89	53.55
8	94.29	82.87	81.56	53.72	61.72
9	97.09	94.21	95.52	65.77	71.77
10	100.00	100.00	100.00	100.00	100.00

CENTRAL REGION

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	40.00	6.70	6.24	5.33	9.24
2	62.10	19.27	18.53	17.16	22.30
3	73.80	29.84	29.60	26.39	31.16
4	81.90	41.54	41.69	35.56	40.60
5	86.00	48.26	48.46	41.45	46.11
6	88.60	54.10	54.12	45.89	50.84
7	92.80	67.31	67.84	55.29	59.36
8	95.10	75.54	76.21	62.94	66.26
9	98.60	90.71	90.89	80.85	83.07
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

SOUTHERN REGION

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	43.66	10.28	6.41	4.01	10.14
2	61.14	24.59	25.87	11.41	19.03
3	70.73	36.51	40.57	18.17	25.87
4	76.12	45.15	52.23	24.18	31.57
5	80.22	50.77	58.88	29.37	36.31
6	83.72	57.25	66.25	34.71	42.44
7	89.91	66.20	74.30	46.83	53.29
8	94.31	79.25	88.38	59.00	64.22
9	97.20	90.33	100.89	71.15	74.80
10	100.00	100.00	100.00	100.00	100.00

CHITIPA

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	41.90	7.27	5.98	3.84	11.78
2	61.70	20.23	19.15	11.97	22.06
3	72.40	37.42	37.91	21.02	32.15
4	78.40	46.61	47.79	26.86	37.93
5	82.60	54.54	56.11	32.35	42.89
6	85.60	61.40	63.67	36.99	47.16
7	89.20	70.13	72.64	44.24	53.34
8	95.20	87.00	88.43	60.51	66.99
9	97.30	94.95	96.10	69.22	74.34
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

KARONGA

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	21.52	1.56	2.30	1.44	4.47
2	41.54	10.98	11.67	7.09	12.12
3	57.26	29.14	31.06	16.25	23.02
4	68.57	41.60	44.17	23.83	31.04
5	74.38	49.48	52.25	29.04	36.07
6	77.18	54.08	57.22	32.02	39.00
7	84.29	66.50	69.68	41.89	47.99
8	90.09	78.23	80.43	52.72	57.70
9	96.20	94.89	96.13	70.19	73.44
10	100.00	100.00	100.00	100.00	100.00

NKHATA BAY

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	59.44	11.68	1.84	3.31	12.46
2	66.23	17.27	3.05	5.34	15.14
3	74.33	33.61	6.86	10.34	20.94
4	81.12	46.69	9.86	15.17	25.91
5	85.11	56.18	11.99	18.97	29.49
6	86.51	60.20	12.93	20.55	31.00
7	86.51	60.20	12.93	20.55	31.00
8	90.51	74.32	95.49	28.48	37.91
9	91.91	80.99	96.86	32.70	41.63
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

RUMPI

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	43.19	7.35	6.10	4.30	12.19
2	59.69	17.80	16.68	11.16	20.79
3	70.59	34.74	35.10	20.51	31.09
4	76.99	44.21	45.26	26.83	37.27
5	83.39	55.90	57.47	35.30	44.84
6	85.29	60.11	62.09	38.28	47.53
7	89.89	70.92	73.14	46.26	55.48
8	93.80	81.53	83.04	56.99	64.38
9	97.70	95.84	96.79	73.42	78.09
10	100.00	100.00	100.00	100.00	100.00

MZIMBA

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	47.50	10.21	8.44	7.20	19.08
2	70.70	28.62	26.93	22.39	36.24
3	82.10	50.84	50.87	37.77	51.55
4	87.80	61.43	62.12	46.63	59.37
5	90.40	67.39	68.29	52.04	63.74
6	91.20	69.60	70.70	54.02	65.38
7	95.30	81.69	82.95	67.21	75.41
8	97.10	87.83	88.63	75.01	81.26
9	99.50	98.87	99.13	90.91	93.24
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

KASUNGU

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	40.70	9.78	9.44	9.31	13.52
2	68.99	30.08	29.20	31.81	37.19
3	77.69	39.99	39.53	41.99	46.52
4	85.19	53.66	53.59	54.60	58.89
5	90.50	64.63	64.57	65.92	68.98
6	94.20	75.10	74.69	75.29	78.51
7	97.80	89.39	89.44	87.25	88.85
8	99.30	96.16	96.31	94.67	95.23
9	100.00	100.00	100.00	100.00	100.00
10	100.00	100.00	100.00	100.00	100.00

NKHOTA KOTA

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	46.34	3.84	8.06	7.77	13.87
2	60.26	8.00	17.62	17.97	24.61
3	77.28	16.08	37.48	36.35	41.46
4	84.28	21.40	50.39	47.21	52.13
5	89.49	25.88	60.99	57.47	61.27
6	94.90	89.64	75.53	70.10	74.13
7	97.00	93.11	83.99	76.53	79.70
8	98.40	95.75	90.30	82.93	85.20
9	99.50	98.26	95.98	90.63	92.09
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

NTCHISI

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	48.35	8.75	8.01	3.63	12.63
2	66.74	20.37	19.39	9.38	24.95
3	76.63	30.29	29.79	13.95	33.46
4	83.22	40.86	40.73	18.31	42.17
5	86.52	46.87	46.79	21.08	47.20
6	89.11	53.34	53.07	23.67	52.56
7	93.31	68.01	68.32	78.61	62.23
8	96.31	79.92	80.46	84.44	72.43
9	99.10	93.38	93.50	92.81	87.67
10	100.00	100.00	100.00	100.00	100.00

DOWA

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	28.97	3.85	3.61	3.07	5.32
2	50.95	13.50	13.00	12.11	15.61
3	63.94	22.56	22.44	19.98	23.41
4	73.63	33.38	33.54	28.40	32.35
5	78.52	39.58	39.75	33.81	37.57
6	82.02	45.64	45.60	38.39	42.61
7	88.01	60.22	60.63	48.70	52.25
8	95.01	79.55	80.18	66.56	68.87
9	97.90	89.25	89.51	77.95	79.89
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

SALIMA

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	48.90	8.33	6.78	6.89	14.42
2	64.80	19.47	17.75	18.71	26.72
3	76.60	32.59	31.58	31.63	38.42
4	85.40	48.26	47.86	45.46	51.84
5	89.50	56.54	56.25	53.65	59.05
6	91.80	62.89	62.46	59.09	64.53
7	96.30	80.33	80.68	73.07	76.49
8	97.00	83.42	83.83	76.31	79.23
9	99.80	98.37	98.39	96.20	96.83
10	100.00	100.00	100.00	100.00	100.00

LILONGWE

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	29.60	4.62	4.45	3.72	6.06
2	53.50	16.48	16.03	14.80	18.47
3	68.60	28.38	28.45	25.11	28.52
4	81.30	44.39	44.95	37.54	41.52
5	95.30	50.11	50.69	42.52	46.24
6	87.00	53.44	53.91	45.03	48.96
7	91.40	65.52	66.42	53.55	56.81
8	92.70	69.58	70.54	57.30	60.23
9	98.60	91.90	92.07	83.43	85.12
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

MCHINJI

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	35.53	3.81	3.46	2.91	5.05
2	52.19	10.19	9.74	8.80	11.16
3	59.88	14.86	14.67	12.80	14.77
4	66.17	20.97	21.03	17.50	19.31
5	72.35	27.80	27.96	23.37	24.47
6	78.04	36.38	36.36	29.78	30.89
7	82.54	45.89	46.30	36.41	36.54
8	88.43	60.07	60.84	49.34	47.49
9	96.01	82.18	82.39	74.94	70.07
10	100.00	100.00	100.00	100.00	100.00

DEDZA

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	50.55	11.84	10.92	9.77	16.54
2	75.98	32.59	31.33	30.22	37.90
3	86.19	45.78	45.27	42.32	48.90
4	89.19	52.00	51.73	47.43	53.87
5	91.79	58.11	57.93	53.05	58.84
6	93.49	63.58	63.28	57.41	63.25
7	96.50	77.13	77.43	67.50	71.91
8	97.30	81.23	81.64	71.50	75.32
9	99.40	94.29	94.36	87.66	89.67
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

NCHEU

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	53.80	1.43	9.38	7.26	12.83
2	72.90	15.05	21.61	17.87	24.52
3	79.30	22.30	28.58	23.11	29.54
4	83.70	30.27	36.13	28.28	34.84
5	87.40	37.88	43.16	33.80	39.99
6	89.70	44.35	48.92	37.87	44.32
7	94.20	62.11	65.84	48.32	53.77
8	95.40	67.50	70.87	52.47	57.50
9	97.40	78.37	80.52	63.09	67.44
10	100.00	100.00	100.00	100.00	100.00

MANGOCHI

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	61.40	19.52	4.19	9.14	26.19
2	74.40	35.19	25.21	21.06	38.12
3	81.70	48.57	41.47	32.20	47.51
4	87.30	61.78	59.05	45.71	58.19
5	91.90	71.08	69.90	58.34	67.80
6	93.50	75.45	74.80	63.63	72.86
7	95.50	79.93	78.58	72.11	79.19
8	99.70	98.31	98.12	97.27	98.02
9	100.00	100.00	100.00	100.00	100.00
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

KASUPE

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	42.60	11.74	9.95	5.06	10.83
2	65.10	32.22	37.92	15.74	23.50
3	80.50	53.53	64.29	27.91	35.66
4	83.00	57.98	70.33	31.02	38.58
5	85.80	62.26	75.41	35.00	42.18
6	88.80	68.44	82.47	40.13	47.99
7	94.00	77.24	90.02	51.54	58.09
8	95.50	82.20	95.39	56.19	62.22
9	96.70	87.30	101.18	61.83	67.07
10	100.00	100.00	100.00	100.00	100.00

ZOMBA

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	49.70	12.87	9.18	4.99	12.01
2	65.50	26.89	29.00	12.02	20.40
3	72.30	36.06	40.76	17.05	25.46
4	80.40	50.12	60.49	26.53	34.40
5	82.50	53.24	64.33	29.33	36.94
6	85.10	58.47	70.51	33.50	41.70
7	91.20	68.53	79.45	46.03	52.86
8	95.20	81.41	93.88	57.65	63.24
9	96.70	87.63	101.19	64.26	68.96
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

CHIRADZULU

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	36.20	8.38	7.27	3.84	8.05
2	53.50	21.35	23.60	10.78	16.62
3	62.10	31.14	34.82	16.52	22.58
4	71.30	44.62	51.72	26.23	32.05
5	83.40	59.84	68.43	40.76	45.70
6	85.30	63.06	71.83	43.51	48.93
7	90.90	70.86	78.02	53.89	58.49
8	93.40	77.66	84.83	60.44	64.54
9	97.70	92.72	100.62	77.52	79.82
10	100.00	100.00	100.00	100.00	100.00

BLANTYRE

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	30.84	5.86	4.93	1.92	4.81
2	52.19	19.67	22.35	7.68	12.13
3	62.67	29.96	37.12	12.38	17.18
4	66.27	34.50	44.26	14.93	19.74
5	72.35	41.10	53.35	19.84	24.50
6	75.45	45.62	59.35	22.85	28.15
7	83.53	55.33	69.01	32.91	37.71
8	88.02	65.87	82.24	40.82	45.24
9	93.01	80.93	102.05	54.14	57.54
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

THYOLO

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	43.14	9.22	4.74	4.52	9.79
2	60.56	22.45	22.25	13.50	18.40
3	69.37	32.61	34.45	21.07	24.51
4	73.37	38.56	42.26	26.51	28.62
5	78.18	44.68	49.31	33.93	34.04
6	81.88	51.04	56.36	40.83	40.34
7	86.69	57.82	62.00	52.29	48.54
8	92.19	72.99	77.93	71.87	61.84
9	98.00	93.58	100.57	74.83	82.46
10	100.00	100.00	100.00	100.00	100.00

MULANJE

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	45.70	10.84	5.96	4.47	12.36
2	61.20	23.81	23.30	11.78	21.50
3	68.80	33.48	35.01	17.75	27.79
4	74.10	42.15	46.52	24.34	34.30
5	75.50	44.11	48.80	26.32	36.18
6	81.10	54.72	60.66	35.85	47.56
7	90.80	69.81	73.33	57.00	67.30
8	96.80	88.02	92.64	75.50	84.60
9	98.60	95.05	100.45	83.91	85.36
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

CHIKWAWA

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	29.17	5.64	4.90	2.21	4.94
2	51.25	19.67	24.11	8.80	13.21
3	63.63	31.63	38.95	14.96	19.73
4	70.43	40.07	50.42	20.29	25.03
5	75.02	44.97	56.25	24.40	28.95
6	80.32	52.58	64.98	30.10	35.79
7	83.61	56.48	68.33	34.65	40.06
8	89.11	69.15	82.08	45.38	50.13
9	94.80	86.05	101.30	62.21	65.47
10	100.00	100.00	100.00	100.00	100.00

NSANJE

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	43.41	10.97	9.44	4.32	9.55
2	59.38	24.30	27.86	10.66	17.33
3	72.76	41.26	49.13	19.50	26.47
4	78.15	50.06	61.21	25.14	31.93
5	82.04	55.51	67.76	29.77	36.25
6	83.64	57.01	71.25	32.05	38.92
7	90.92	68.32	81.07	45.42	51.16
8	93.52	76.17	89.68	52.15	57.34
9	96.11	86.28	101.29	62.35	66.41
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

KARONGA RURAL DEVELOPMENT PROJECT (PART OF)

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	22.01	2.33	1.79	0.88	3.41
2	37.01	8.84	8.48	3.99	7.76
3	52.99	25.89	27.30	10.82	16.19
4	58.99	31.98	33.92	13.77	19.42
5	67.99	43.26	45.88	19.70	25.35
6	69.99	46.29	49.26	21.26	26.94
7	76.99	59.56	60.96	28.38	33.83
8	85.00	72.48	75.08	39.33	43.83
9	92.00	90.08	92.25	54.00	57.54
10	100.00	100.00	100.00	100.00	100.00

LILONGWE LAND DEVELOPMENT PROGRAM (PART OF)

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	17.80	2.37	2.39	2.07	3.09
2	35.00	8.94	8.73	8.51	10.54
3	54.01	20.45	20.63	18.97	21.10
4	63.81	29.96	30.31	26.72	29.46
5	76.11	43.50	43.76	39.07	41.58
6	79.81	49.06	49.08	43.47	46.51
7	87.21	64.68	65.08	55.03	57.51
8	96.40	86.76	87.25	76.39	77.73
9	98.20	91.99	92.25	82.82	84.06
10	100.00	100.00	100.00	100.00	100.00

TABLE B.2 (CONTINUED)

CENTRAL REGION LAKESHORE DEVELOPMENT PROJECT (PART OF)

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	65.73	13.48	10.95	10.78	22.33
2	78.13	24.17	21.66	21.86	33.41
3	84.32	32.65	30.75	30.02	40.51
4	88.52	41.83	40.46	37.94	47.89
5	90.61	47.04	45.82	42.97	52.15
6	90.61	47.04	45.82	42.97	52.15
7	94.81	67.03	67.07	58.63	65.02
8	95.81	72.46	72.72	64.19	69.56
9	100.00	100.00	100.00	100.00	100.00
10	100.00	100.00	100.00	100.00	100.00

LOWER SHIRE VALLEY DEVELOPMENT PROJECT (PART OF)

Ranked Economic Classes	(H)	(G)	(N)	(N_W)	(N_T)
1	19.49	3.54	3.65	1.39	4.11
2	37.08	13.73	18.07	5.94	9.87
3	54.67	29.21	37.94	13.53	17.96
4	63.96	39.73	52.72	19.86	24.28
5	68.55	44.20	58.22	23.43	27.71
6	73.15	50.22	65.35	27.72	32.90
7	83.44	61.30	75.20	40.04	44.52
8	90.82	76.82	92.62	52.54	56.35
9	93.61	84.37	101.50	59.70	62.92
10	100.00	100.00	100.00	100.00	100.00